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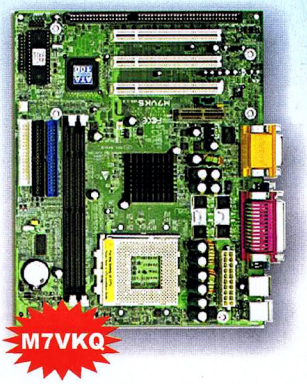

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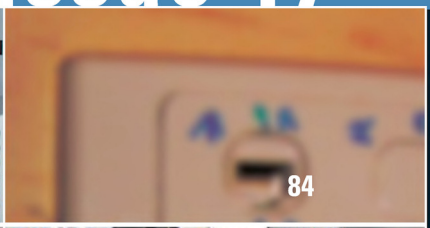

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Finally we're getting a newish subsystem architecture, does it rock very hard or n0txx0r?

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Should you fork out extra bucks of a hardware RAID controller when software RAID might be just as fast?

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What do you get when you combine the Steyr assault rifle with a first person shooter? The Australian Army's W.T.T.S. training system, that's what. Lock and load gentlemen.

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Neons - bleh. Perspex - meh. Home made fanbus - phwoar! Water Cooling - now you're really talking!

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So you've modded your PC, your car and your cat. Now it's time to mod your house.

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Goodbye B.S.O.D., hello stable PC. Doc Dan selects the sparklingest letters from miserysmacked tech desperados and offers up mostly sympathy.

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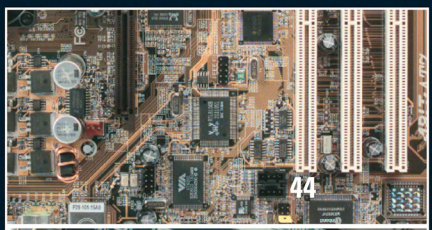
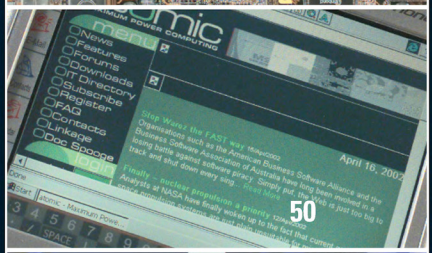
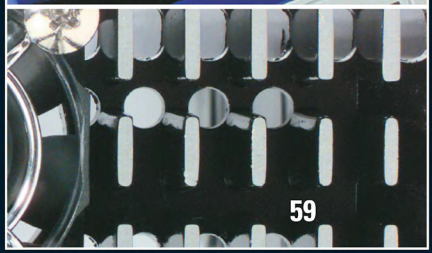
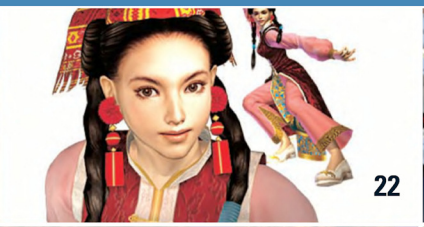
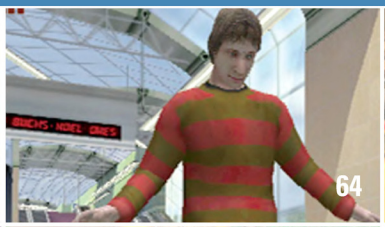
Sick of telling your mum/girlfriend/workmates about computing issues and getting an "Erm, what the hell are you talking about?" response? This is the section for you.











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Everything is serious. Everything is important. These two truths are in obvious conflict - so how to reconcile? Atomic 1, our XT PC equipped with a reverse engineered, captured alien technology Hercules monochrome graphics adaptor, produced this solution.

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National Geographic magazine recently sponsored a canoe expidition up the Xaambliexie river, in search of the Lost Box Pyramid of the Tentucharlatans. What they found was a little guy in straw boxer shorts that had never heard of Atomic.

COMPETITIONS 86

We'd like to present to you The Great Games Giveaway. This month we've got 5 copies of 4 seriously cool games to throw your way. Well, not all of you just the ones that are able to miraculously combine amazing good fortune with crackling trivia skilz. And the winner is...

The beautiful box

Everything runs on supply and demand. If we the majority really want something, then it's likely those that give us the things we want will comply. Except when it comes to computers and the reason why they're beige. Office photocopiers and telephones are beige, so computers have to be too, apparently. But what about PCs for the home? Italian kitchen equipment is shiny silver, which is also how many of us like our PCs. Home audio gear is black, which is how many of us also like our PCs. Big-arse TVs are also chunky black. All these devices, and the rest of the plug-in stuff at home, are designed to be good looking: to look perhaps more sophisticated than they really are, to be pleasing to the eye, to instil a sense of pride in ownership. Telephone answering machines are sexier looking objects than PCs. It's absurd!

But of course, that's all history now. Today's semi-cool off-the-shelf boxes are a natural evolution in commercial design inspired by the work of the early case modding pioneers.

Now, we are cheered enormously by the recent move by IBM, HP and Dell to give beige the boot it's deserved for all these years. Black is now the base colour for PCs from these companies. About friggen time.

And just in time, too. John's report on PCI-Express shows that, despite the lame name, a new era of physical PC design is about to happen. With PCI-Express (the technology formerly know as 3GIO), key components will be installed or upgraded via a neat modular form factor. Take a long, loving look at those sexy capacitors on your video card, because, soon, the whole lot will be wrapped up in a smooth plastic casing. I should also mention the potential 10x speed boost in bandwidth which PCI-Express will provide, but that's not what I want to focus on here and now, besides, John does a most excellent job a few pages in. I can see Atomic running stories in a year or two on hacking (literally) into these injection-moulded modules to get at the silicon inside. The integrated cooling inside these packages will surely be examples of funky design, so we'll want to get in just to have a look.

Speaking of creating beautiful engineering, special kudos to Brendan Bates — the artist who created our stunning cover image. Working with Brendan as he developed the conceptual sketches gave us an early confidence that this would be one of, if not the best Atomic cover. Our vision of a most severely extreme fantasy box has been realised and I'm sure you'll agree that it's utterly bitchin. There is wallpaper for you to download right now, so come and give us a hit and dress up your desktop like the tart that it is.

Making a beautiful PC that looks as hot as our cover girl would be a challenge. But we're providing the guidance to make something potently hot anyway. Starting this issue is an ongoing guide to building a fully hot box. You may want to follow us step-by-step, or perhaps just mod the bits you like best, or haven't yet done, on your already beautiful machine.

Or, if you're one of those rare and fortunate people that are both lazy and lucky, you could win our box once we've finished building it for you. Champion.

Ben Mansill

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Short Circuits

IBM's ASCI White is now a poor second cousin in the Supercomputing world after researchers working for NEC unveiled the company's latest supercomputing effort: the NEC Earth Simulator.

Built for analysis of weather and other natural phenomena, including earthquake patterns and global warming, Earth Simulator is comprised of 640 individual nodes. Each node has 16GB of RAM and eight custom-built vector processors. Combined, the 640 nodes give Earth Simulator a peak theoretical performance of over 35 Terra FLOPS (FLoating point OPerations per Second).

As the name suggests, Earth Simulator will be used to create a 'virtual Earth' on which variables can be changed to see what global effects they have – akin to the Earth from Douglas Adam's *Hitchhikers Guide to the Galaxy* series. However, rumors of a white rodent plague and Magrathean influences on NEC staff involved at the Earth Simulator project are yet to be substantiated.

SEGA has announced it will form a US division dedicated to the creation of games for mobile phones, PDAs and other mobile devices.

The company already sells mobile games to telecommunications carriers in Japan, who then on-sell the games in packages to their own customers.

Demand in the US at the moment is relatively low, however it's expected to pick up as the American mobile network further evolves. Judging by current Australian standards, we can expect to see the same services offered some time next century. If we're lucky.

Developers, developers, developers

Considering the rising importance of Taiwan in the global hardware marketplace it is unsurprising that Intel chose Taipei as the location for its Asia Pacific Intel Developers Forum (IDF). This event is part technical education course, part schmooze-fest and part new product showcase.

Central to the event were a series of Keynote speeches by Intel Vice-Presidents, providing updates on current technology and windows into the research work being done by Intel Labs, the enormous R&D Division responsible for Intel keeping on track with the overarching corporate philosophy of Moore's Law.

The keynote speeches put forward a picture of where Intel sees the PC heading in the next few years. Central to this vision are several technologies supported by Intel that will supposedly change the way PCs are designed. One of these, USB 2.0, is finally gaining support at both the motherboard chipset and the peripheral level. Next on the Agenda is Serial ATA, the biggest thing to happen in desktop storage in years. Serial ATA has several advantages over the current Parallel ATA technology: the narrow cables help to facilitate better airflow within the system; while the reduced pin count means that crosstalk is reduced, allowing funkier things to be done with the location of drives within a system. Serial ATA is due to become mainstream in the second half of this year.

In the medium term, PCI-Express (the new name for 3GIO) will change how we look at expansion devices. This has led to the creation of concept PCs based upon hot pluggable modules that eliminate the need for opening the case to add new functionality to the existing system.

ABOVE: Intel VP Louis Burns shows off the Bridgewater concept PC.

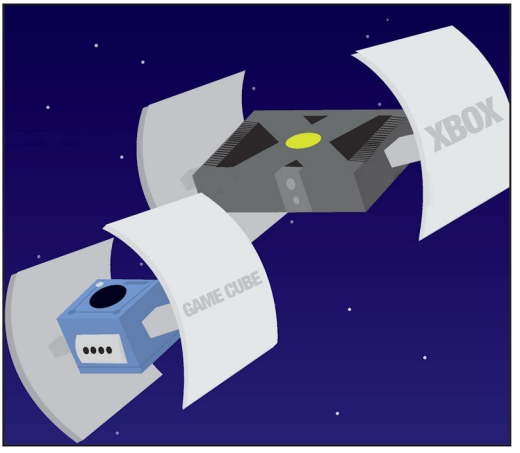
The combination of these technologies is the core of Intel's 2003/2004 concept-PC known as Bridgewater. This system looks uncannily like a PlayStation 2 put together by someone with a fetish for rounded edges and silver trim, and if it does see the light of day it is set to forever change the way we look at the desktop PC.

In terms of today's technology, Intel were running demonstrations using a 3GHz desktop Pentium 4 system, using a processor taken from the standard production lines. We should be seeing the 3GHz Pentium 4 in the marketplace by the end of this year.

Also on display were a host of other new technologies, including a working sample of Banias, Intel's completely new mobile CPU that will replace the mobile Pentium III as a low power solution. In fact, mobile computing received a lot of attention during IDF with technologies ranging from a software project dubbed Skemania, which is designed to make roaming between wired and wireless networks as seamless as possible, through to 'Radio Free Intel'. This is a revolutionary project designed to reduce the multitude of chips and antennas currently needed for wireless networking into a single multipurpose chip. While this sounds impressive, the real kicker is that Intel wants to integrate all this reduced circuitry first into the motherboard chipset and then take it onto the actual CPU die.

On the non-Intel front, there were some very funky third party products on show. One of the sexiest of these was Hitachi Cable's integrated water-cooling solution for notebook computers. Usually the term 'water-cooling' means 'heat pipe' when applied to notebooks, but this is the real deal, with a reservoir and pump carefully secreted around the notebook case. RAMBUS had a range of Dual Channel RDRAM on display in both PC800 and the new PC1066 varieties, and the once mighty Trident Microsystems was telegraphing its comeback with the new DirectX 8.1 compliant XP4 3D chipset.

Console Wars: Microsoft strikes back



The few remaining cynical die-hard gamers who view the console arena as strictly 'kiddie gaming' must be sorely tempted to put down their keyboard/mouse combos right about now, if only to check out what the heck all this fuss is about.

Never before has competition among the consoles been so hot. Microsoft slashed $250 off the retail price of its Xbox console at the end of April, attempting to turn the tables on sales figures reportedly as low as 40% below initial projections. However, there seemed to be more to the story than just lagging demand, so we sent our Atomic Spy Network into overtime mode in an effort to winkle out any undisclosed reasons behind the cut. From reports we've received so far we can say that many within the Industry are whispering about pressure from several major Xbox game developers, demanding Microsoft cut its retail pricing so they could sell more games — though this is nothing new for developers on any platform. The theory behind this was that by making the Xbox price competitive with the rest of the console market in Australia, a boost in market penetration would occur (assuming essentially equal pricing, game developers were betting on the Xbox being seen as a much better console which would hopefully boost sales of the hardware) enabling developers to pitch Xbox games at a much wider customer base and hopefully push up their own sales figures in the process. This hoped for 'bigger piece of the pie' garnered by the price cut would have to come from either the current market for the PlayStation 2, or the potential one for Nintendo's GameCube.

Speaking of Nintendo, the company must really have been feeling the pressure after Microsoft's announcement. Retail pricing for the Australian launch of its GameCube console was initially set at $399 and, with Microsoft having a two-month head start on Nintendo (and Sony having almost a year and a half on both of them), the potential for its console to reach the dizzying heights Nintendo had planned were looking shaky. Consequently the company announced a reduced retail price of $329 for the Cube's May 17 launch.

At time of writing the last major player in the console arena, Sony, was yet to react to either announcement. With a huge lead in the Australian market and sales figures of around 300,000 units, the industry leader may not need to respond at all. Healthy sales figures and deep market penetration for the PS2 are already self-evident and with development of the PlayStation 3 console apparently proceeding nicely, Sony may choose to let its PS2 hardware pricing stagnate in anticipation of blowing us all away when it releases the PS3.

It remains to be seen whether Microsoft's Xbox price cut will ensure success for the console. Certainly it will increase competition in the market, which can only be seen as a good thing for gamers. However, combine the sales figures of just over half the amount initially projected, along with the recent resignation of the main driving force behind Xbox at Microsoft, Seamus Blackley, and it beggars the question: does Xbox have the staying power to compete in the long term – or will succumb to the same fate that befell Sega Saturn and the Atari Jaguar before it?

Regardless of which piece of hardware wins the pending Console War, one thing is certain: the charred and battered remains of the final loser are sure to find a loving home, just as the DreamCast has, among the growing console hacking community. Mostly as cheap Linux boxen. WOOt!

Short Circuits

Once again Google has proven itself to be one of most valuable resources on the Net, this time with the release of the Google Web API. The Google Application Programming Interface is designed for use by developers who need an interface to the Google search engine. Programs that take advantage of the API will then be able to search Google's entire database without using the current HTML front-end.

The API is currently free, however it is available for non-commercial use only and each license is limited to 1000 queries per day.

Creative recently announced the latest in its Nomad MP3 player line: the Creative Nomad Jukebox 3. Touting a 20GB storage capacity, MP3, Wav and WMA support, 11 to 22 hour batter life, USB 1.1 and (more importantly) SB1394 connections, the new-improved Nomad will be released in Australia late May for an estimated retail price of $999.

Amazon makes a profit and the universe implodes. That was the theory anyhow, until Amazon shocked the entire world by actually making said profit – $US 5million to be precise. We're sure Jeff Bezos felt smug when his company delivered the news to investors. However, one wonders how Mr Bezos feels now, after Amazon reported a loss of $US 23million for the quarter. Perhaps he will find a way to cut costs and recoup that lost 'something' his company had when it actually did manage to scrape together enough money to cover the payroll and electricity bills.

Either way, those 'bricks and mortar' operators every dotcom player laughed at during the late nineties actually knew what the term 'business plan' meant, while most of the dot bombs did not. Which explains a lot.

Short Circuits

IBM is planning to form a Joint Venture with Japan's Hitachi Corporation for the manufacture of hard drives. The new venture will be 70% owned by Hitachi, which will also purchase IBM's existing hard drive assets as part of the deal.

While some analysts are pointing towards a general downturn in the HDD market and IBM's loss-making OEM Technology Group (of which hard drive manufacture is a part) as the main reasons behind IBM's decision, another plausible reason is the influence of IBMs cursed GXP series of drives on the general IBM HDD brand.

GXP failure rates have been highly publicised online, with many well-respected hardware sites going as far as replacing all IBM GXP drives used in their labs. Combine this with bad word-of-mouth IBM HDDs have been receiving in online forums (the Atomic forum is a good example – www.atomicmpc.com.au/forum.asp) and it's easy to see how future consumer-level hard drives from IBM may receive a poor reception. IBM's joint venture with Hitachi, however, will allow the company to make money on the HDD market via Hitachi-branded drives while shouldering very little risk.

Optus has finally confirmed its interest in running a residential DSL service. The announcement comes after ACCC speculation on the possibility of implementing 'line sharing', where a single copper line could be used by different carriers – a Telco such as Telstra for voice services and a DSL provider for data services. This line sharing technology would allow DSL providers access to the local loop without having to bear the full cost of each line, thus making residential DSL provisioning a much less costly venture.

Atomican

Last month marked the first anniversary of my being part of the Atomic Community. For the past year I've posted, hmm'ed, lol'ed, discussed, argued, waited, suggested, joked, indeed'ed, and praised my way through many a discussion in both the forums, and the IRC channel. Thinking about this, I pondered as to how the forums and channel had been able to keep me enthralled for the past 12 months.

Could it be the diverse spread of society that has also be drawn in, who share their experiences with all who come to listen? Perhaps, it is the broad range of ages of other Atomicans who help the younger ones on such topics as 'How Do I Kiss'? Is it the way in which Atomicans are more than eager to help their fellow Atomicans with any problem, computer related or otherwise? On the other hand, are we just good at l337 5p34k?

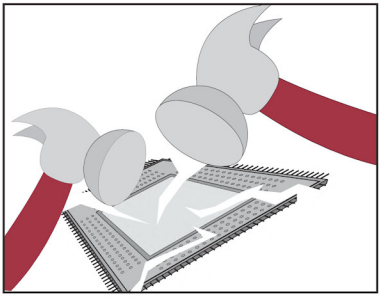
I personally think that it is a combination of everything I have just mentioned (well maybe not the l337). We are a group of individuals operating as one functioning body. We all have our own Über-ness that we contribute, be it wit, humor, tech skills, observation, argument, management, etc.

Take for example the upcoming Atomic m337 version 2.0 (www.atomicmpc.com.au/forum.asp?cat=co&top=35798) BobTheMonkey, Gramyre, and a host of other Atomicans spending their own time to organise the m337, just for the sake of meeting their fellow Atomicans on 18 May and to indulge in some alcomohol-induced frivolities (including Atomic stickerage I'm sure).

Then there are the threads of classic quality, the ones that all the 'old skool' Atomicans remember. Back in the days when getting 100 replies to a thread was enormous, and a post in General would last on the front page without a reply for at least six hours. The Sidekick thread, The Australian Army thread, Jesus: Just a Man, and the many 'Early 2002' threads, are just a few. Just goes to show how much things can grow in a year.

So if you're not already part of our melting pot of society, come on in, give us your 2.2cents (inc. GST), have fun, and consider becoming a regular part of our Community. I guarantee you won't regret it.

The Duron is dead



AMD recently announced plans to phase out its popular Duron processor core at some point towards the end of this year. The phase out makes room in AMD's product lineup for the company's consumer level Clawhammer chip that's expected to become available around the same time. Once Hammer hits, the Athlon core of the day (most likely Barton) is slated to take the Duron name, becoming AMD's budget, consumer level processor.

The phase out of Duron allows AMD to convert its Austin Texas fab, which currently handles production of the Duron chips, to flash memory production only.

Meanwhile, production of Athlons will be outsourced to a UMC foundry in Taiwan while production of both Clawhammer and its bigger brother, Sledgehammer (now officially named Opteron), will be carried out at AMD's Fab 30 in Dresden.

AMD president Hector Ruiz had the following to say about the changes: 'We intend to have Fab 30 become dedicated to Hammer. We will use UMC to make a large number of Athlons to meet the market needs'

This statement suggests AMD will be concentrating solely on its Hammer line in the short to medium term, giving Athlon production to UMC as an afterthought aimed at filling any small demand that could potentially crop up in the market prior to the Hammer gaining popularity.

Despite the changes, AMD still has one final die-shrink planned for the aging Duron: a move to the 0.13 micron Appaloosa, scheduled for sometime this quarter.

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- DURON – AMD's budget core has served us well
- $399 – Xbox gets even better
- AT7 – The next generation
- BIG BIRD – Worth turning the TV on for

WHAT'S NOT

- ISA – Now nothing but a bad memory
- OPTERON – Bring back Sledgehammer
- $649 – Xbox? Poorbox is more like it
- AT-AT – Even the Death Star doesn't have USB
- BIG BROTHER – George Orwell rolls in his grave

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10.45
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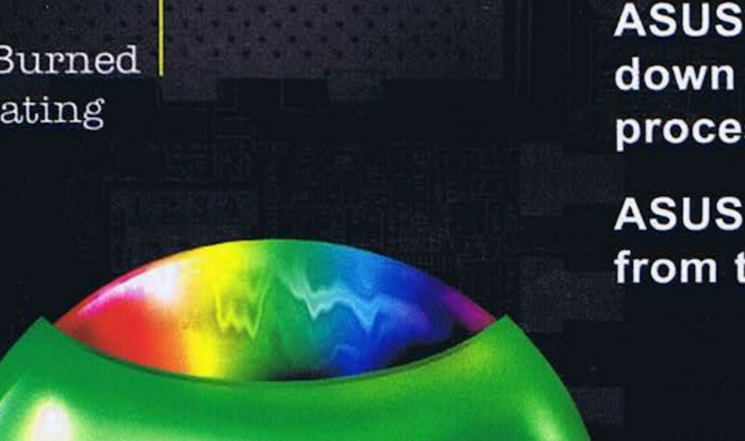
A7V333



A7V333 Specification:

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- 5 x PCI, 1 x AGP Pro
- C-Media 6-Channel Hardware Audio with S/PDIF Support (Optional)
- Promise ATA133 RAID 0, 1 (Optional)
- 4 x ATA133 (RAID ATA133 is optional)
- ASUS CPU Overheating Protection (C.O.P.) Support
- ASUS POST Reporter[a] , ASUS MyLogo[a]
- Smart Card/Memory Stick/Secure Digital (Optional)
- 4 x USB2.0, 4 x USB1.1, 1 x IEEE 1394 (Optional)
- ATX Form Factor

ASUS C.O.P.
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Life imitates games. . .

Ashton 'Nice' Mills ponders life wistfully, while sitting in the park watching the children play nicely.

So there I was having a picnic in the national park, watching the kids playing ball and frisbee games, looking at the mothers fussing over food on blankets and smiling at fathers teaching sons how to play cricket, and it hit me like the monstrous crash of a resource silo going up.

'This is just like a Maxis game,' I said, 'Kids in the park, families in the sun by the water, people just walking around doing mundane stuff – it's like the Sims!'

Nolie laughed and looked at me like I was one round short of a clip. She couldn't see it like I could: the truth plain as day and bright as a flashbang grenade.

'Life imitates games, you know,' I said, nodding wisely like the sagely mage I knew myself to be.

She gave me one of those 'Uh-huh' looks, so I tried to explain it better to her. 'This,' I declared, waving my arms around at the abundance of green outdoors stuff which would make a perfect spot to set up a base, 'looks like the type of thing you find in a game.'

Her laughter stopped and I knew she could hear the wisdom in my voice (or maybe she realised I was being serious). Having captured her attention I continued, 'The park, remarkably similar to Everquest as it is, and the people and the things they are doing – it's all inspired by computer games.'

She stared at me.

'Social interaction? It's there. Pleasure and sadness? There too. War and peace? You know it. Life was modelled from gaming, for sure. Fully to the tenth degree. Area secured!'

Her blank stare and silence clearly meant she was finding the truth hard to absorb, I decided to make it a little easier: 'Competitive ball games,' I said, pointing at two boys with a football marking off against each other like two gigantic Battlemechs about to unleash a fiery rain of death upon one another, 'The whole win/lose thing – where'd you think that came from? Games! You can feel it deep inside in that place where The Zone comes from.'

I paused to consider the glory of The Zone. What other evidence do you need? More powerful than a Big Bertha and just as exhilarating, the effect of The Zone is real in the world and most often brought out in computer games.

Those times when you are just *it*, when you merge with the fabric of the game-time continuum and you become, at least for a while, one all powerful hard-to-frag mutha of a death-dealing sentence against all who would oppose you, against those who dared to laugh at your pet dog Fibblebum, against all those who. . . Ah, I digress.

'The Zone,' I repeated wistfully, turning to look at her.

I think I saw a subtle movement in her lips that was either the awe of enlightenment dawning, or just a yawn. I couldn't be sure, but I smiled and nodded encouragingly. 'Look at the last couple of world wars – don't you think the uniforms and weapons in World War I bear an uncanny resemblance to the ones in DoD?'

'And why,' I continued, 'do you think Microsoft has pumped so much into the Xbox? Because Bill knows the score, he knows where it's at, he's tapping into the very fabric of life itself!'

Yeah, this was it all right. The naked truth, the hard boiled egg, the MP5 *with* a laser sight and silencer upgrade. My safety catch was off, I was preaching the double-barrelled goodness of wisdom like John Romero himself was speaking through me.

'Society is a game, conflict is a game, work is a game and entertainment is a game. All is game!' I raved.

Then I paused for dramatic effect, my words so pure I could taste them on my tongue.

'And if we're honest with ourselves, the world itself is so obviously modelled off Populous – or maybe it's Black and White – I haven't quite worked that one out yet, it's complex.'

I sat back to let my words sink in and looked around again at the park. The plastic garbage bins nearby had lids that looked like the top section of a Cobra from Elite, and I knew that somewhere in council-land the man who designed garbage bin lids was also a master pilot not to be trifled with.

'Ashton,' she said, breaking my contemplative concentration, 'don't you think it's the other way around?'

This is why I like Nolie, you know? She still has that newbie innocence that we all used to have right before we were PKed for the first time. I laughed loudly and told her how naive she was being, that one day she would realise the truth and dive into gaming full swing, immersing herself in the pure source of the glorious universe.

'If life imitates games,' she said, poising her words like a strategically-aimed rail-gun, 'Where's the save game option?'

Her words shot into the bunker of my mind and exploded like a well-placed 'nade.

I rallied my thoughts for a counter-offensive, then spoke with all the confidence of an insurmountably large Planetary Defense Base: 'Pfft!'

She raised an eyebrow, so then I elaborated a bit.

''Sif anyone actually uses save games! Next you'll be telling me people read *manuals*!'

'Life imitates games, you know,' I said, nodding wisely like the sagely mage I knew myself to be.'

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MV42N

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Moore's Wall

If Moore's Law reaches its limit, what then? Tim Dean's open to ideas.

I predict that within 100 years, computers will be twice as powerful, 10,000 times larger, and so expensive that only the five richest kings of Europe will own them. Of course, when I say this, I am referring to a quote from the eminent Professor John Frink from his days at the Springfield Heights Institute of Technology back in the 1970s.

So, how powerful will computers get? Just about any answer I give here will likely result in me being very embarrassed only a few years from now at how inaccurate it was.

Meh... I'm going to take a crack at it anyway.

So far, Moore's Law (loosely defined these days as being that microprocessors will double in performance every 18 months, although the original stipulation by Moore was actually about the number of transistors on a microprocessor) has held with uncanny accuracy for the last 37 years. There is every likelihood that it will remain accurate for at least another 15 to 20. In rough terms, this means in the year 2020 we should have desktop processors that are equivalent in performance terms to a CPU running at something like 8THz, or 8,192GHz, or to get really silly: 8,192,000MHz.

Nice.

So why will Moore's Law run out? In fact there is nothing to say that it will in its current definition of processor performance, but in its original definition of the number of transistors on a microprocessor, we will eventually get to that point I call 'Moore's Wall'. Basically processors work by switching heaps of bloody little transistors from one state to another to represent 1s and 0s. They are switched using electrical current, and this current needs to travel around the processor in an orderly fashion. As the components of a processor get smaller you get problems with the movement of the current through resistance; the insulation of one path from another to prevent interference and crosstalk; the materials needed to allow quick switching of transistors; and the wavelengths of light used for the lithography that etches the traces in the processors during manufacture.

Current research indicates that we will not reach this wall until the manufacturing process gets down from the 0.18 micron where we are today, to 0.009 micron, at least according to Calvin Chenming Hu, Chief Technologist at TSMC (Taiwan Semiconductor Manufacturing Company – the company that makes a great deal of the chips we use today, including the GeForce range).

What then? We have a few options we know about that are already undergoing research, including optical computers, DNA computers, quantum computing, and neural networks.

Optical computers replace the electrical current with light, which is potentially much faster, but comes with its own limitations. DNA computers are a development of research into solving complex mathematical problems using vats of RNA strings. While they don't actually 'compute' anything, and it's unlikely you'll ever run Quake on one, they still have potential for certain applications, like cryptography.

Quantum computing is really kooky, but also pretty cool. It's a tall ask, but ultimately it could result in computers that are just so fast that adjectives don't do them justice. I'll try anyway. They could well be stuperificanatiously hyperfnesiant.

Finally, and my favourite, is neural networks. When you're talking about maximum power computing, to me this can ultimately only mean one thing – the brain. The brain's wicked. It might not be terribly good at floating point calculations, but most human brains won't have much trouble ecipheringday hatway iay may ayingsay erehsay – talk like Yoda even if I do, yes?

There are plenty of computers that can beat us in chess, but I am yet to meet a computer that threw a tantrum because you took its knight – and stormed out taking its board with it. That takes real computing power.

Neural networks in computers can already do a lot of things that conventional serial computers cannot, such as learning, as well as other calculations that are ideally suited to its non-serial nature, such as pattern recognition. We still have a long way before any neural networks can compete with the processing power of the brain. The brain packs around 100 billion neurons, and each of these can be connected to as many as several thousands of other neurons (although in reality, many of these 100 billion neurons are specialised, and may only connect to a few others, while some are super-connected, and can form very complex hubs). There is no easy way to equate the processing power of the brain to the processing power of a CPU, but with around 100 billion neurons running at roughly 10 operations per second, you get a figure of around 1 trillion operations a second (again, in reality not all of your brain is going nuts at 10 operations per second, so the real number is probably in the low to mid billions). This is still an impressive number, and one that is far from being matched by even the most powerful of today's neural networks.

So, even when we do reach Moore's Wall, there are still plenty of options. We can be sure that there will be applications running on these devices that are far beyond anything we can possibly imagine today, and the computers could well be three times more powerful, 15,000 times larger, and so expensive that only the three richest Sheiks in Arabia could afford them. And you can take that to the bank...

'I am yet to meet a computer that threw a tantrum because you took its knight – and stormed out taking its board with it.'

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Video memory mysteries

Daniel Rutter claims size isn't everything.

Video cards with 64MB of memory on them are common items these days. 64MB of very speedy Double Data Rate memory, even. The (relatively) cheap GeForce4 MX 440 uses DDR memory with a doubled 200MHz default clock speed – that's the same speed as the memory that is included on the GeForce2 Pro and the GeForce3 Ti200.

Current high-end cards – your top-flight Radeon 8500s and full GeForce 4s – have 128MB of memory.

Which raises the question: why?

Do you need that much?

Working out how much memory a given display mode needs for 2D video purposes is easy. Pixel width times height times bits of colour data per pixel equals bits in the frame buffer – the block of memory that the graphics card feeds to its digital-to-analog hardware to create the image that appears on the monitor.

If you're running your PC in 1600 by 1200 resolution, with 32 bit colour, then that's a total of 61,440,000 bits for the whole display, which is 7,680,000 bytes, which is 7,500 kilobytes, which is about 7.32 megabytes. It's not 7.5 megabytes, because there are 1024 bytes in a kilobyte and 1024 kilobytes in a megabyte. This is something that marketing people conveniently forget when they're telling you how big hard drives are.

If you're using double buffering, and today you almost certainly are, then that doubles this memory requirement. Double buffering renders the upcoming frame into another area of memory from the frame buffer, so the incoming data doesn't affect the currently displayed frame.

Even at 1600 by 1200 16MB is still plenty to handle double buffered 2D video.

Full Screen Anti-Aliasing (FSAA) can eat a lot more memory. Basically, all flavours of FSAA render more pixels than they have to, and then average them out to give a final image with smoother diagonal edges. Jaggy diagonals look bad enough in still frames; when there's animation going on they look even worse, causing the stair-steps to appear to 'crawl' up and down the lines.

FSAA doesn't change the amount of memory needed for the final display buffer or its double-buffered twin, but it adds yet another buffer, for the intermediate higher resolution data – that's two or four times as big as either of the other two.

Assuming 2X FSAA, we still haven't used up all of the memory on a humble 32MB video card.

All of the *rest* of the modern 3D memory budget is being taken up by 3D data.

Some of the 3D data is the Z-buffer and stencil buffer. The Z-buffer is used to determine what's in front of what in the rendered scene; the stencil buffer is another piece of unnecessary-pixel-rendering-avoidance technology. Current chipsets are able to make these buffers much smaller than the final display buffer.

The *real* RAM hogs are textures and their relatives: light maps, bump maps, and so on. This is all of the stuff that goes on the surfaces of objects so they don't have the construction-paper-model look of old school 3D games.

The amount of memory taken up by textures varies massively, depending on how many textures are actually needed at once, what resolution they are, what colour depth they are (they don't have to have the same bit depth as the final display) and whether they're compressed or not in the card's memory. You can change all of this stuff and so there are umpteen possible texture memory loads for any given game.

If you blow your memory budget – in other words use up more video RAM than your graphics card has – AGP graphics cards can use system memory for textures.

Unfortunately, even AGP 4X isn't fast enough to make this practical. AGP 4X has a peak bandwidth of about one gigabyte of data per second; the DDR memory on a GeForce4 MX 440 moves six gigabytes per second. AGP 8X, when it's available, is not going to make a big difference to this. AGP texturing is always going to suck compared with on-card texture memory.

It's possible to use more than 64MB of video memory with current software. FSAA in high resolutions can push up the frame buffer-related RAM usage enough to need more than 64MB, along with a decent slab of high detail textures.

But since most 21 inch monitors don't have enough phosphor dots to clearly display 1600 by 1200 in the first place, and smaller screens are even worse, adding FSAA at those resolutions doesn't make much of a difference. People do it, but there's not much reason to.

Similarly, pro 3D rendering software can make use of a ton of video memory if you're previewing your troupe of hairy spiders all mapped with different high-res Old Masters and all juggling shiny teapots mapped with different high-res Belgian whoopee cushion erotica. That scene will rotate faster if you've got more space for textures on the video card.

For most people 64MB is still more than enough.

Games are written for the most popular hardware, not for the most powerful hardware. So it's still not easy to find anything that'll stretch a 64MB card, even with texture detail turned all the way up.

If you're not doing some odd pro-3D job that involves tons of vast textures, and you don't have a display that'll let you see the difference between FSAA and non-FSAA in Extreme Resolution, then staying under 64MB is easy, and will stay that way for a while yet.

'This is something that marketing people conveniently forget when they're telling you how big hard drives are.'

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Ozzidave's Iron-Box

Technical details

- Asus A7V133
- Duron 1.2GHz
- Hercules Geforce3 Ti500
- Kingmax 512MB
- Adaptec 3200S w/32mb
- Intel Hudson backplane
- Seagate 9.1GB SCSI
- Seagate 18GB SCSI
- IBM 18GB SCSI
- IBM 30GB ATAPI
- IBM 45GB ATAPI
- Sound Blaster Live! Platinum
- Intel 82559 dual port NIC
- RD1 BIOS Saviour

The Story

This case was found one day when I went into a computer shop to get something. It appealed to me the moment I saw it, so it came home with me. Being a big fan of RTCW and Half Life's Day of Defeat mod, the idea was to have the case painted in the colours of the German flag. These days having a window cut in is the norm, so I decided to have the Iron Cross cut in on both sides in addition to a window. This case was so solid, you'd be forgiven for thinking it was made back then too, as there was no way a dremel would cut it, so out came the jigsaw. The case was cut out and masked up to be painted. It took more then 20 coats of black, red and yellow paint to finish. A floppy drive and CD drive were painted matte black to match the case, however there was not enough room for the floppy so it was left out. I wanted the case to have smooth edges so bolts and screws where forgone for attaching the grill and window. Araldite was used in their absence. It worked a treat!

Joshua's Merlin

Technical details

- Lian Li PC-75
- Epox 8KHA+
- AMD Athlon XP 1600+ @ 1900+
- 512MB Micron DDR-RAM
- 500W Topower Power Supply
- 9.1GB Seagate SCSI Barracuda
- 40GB IBM 60GXP
- Yamaha 8x4x32 SCSI CD-RW
- Pioneer 16x DVD Region Free
- Leadtek GeForce2 PRO 64MB
- Adaptec 2940U2W SCSI Card
- Thermalright SK-6 w/ 92mm fan
- Bad-arse black finish
- Hot lighting

The Story

I know my mod doesn't take the most original design award, but I see a lot of mods on old cases where it doesn't matter too much if you get it wrong.

My challenge was to get one of the more expensive cases (Lian-Li PC71USB) and take to it with a jigsaw. Once I had the sweet Lian-Li in my hands the first choice was PSU. I went with Topower's 420W duel fan Gold for plenty of head room. My main focus was wiring and general neatness, with a little attention to good airflow, because as everyone knows overclocked Athlons and video cards generate a fair amount of heat. Cooling is standard with 9 x 80mm fans, a thermo engine on the CPU and some cheap sticky tape to block any holes that cold air could escape from – I managed to keep the temp down around 45 degrees under a full and heavy load.

The rig is used mostly for gaming so I filled it with everything I could afford, a few well placed LED clusters, blow holes, window and fan bus and I was left with one expensive, bright black box.

Proud of your Hot Box? Send us a pic and you could win a free six-month subscription to Atomic! hotbox@atomicmpc.com.au

RBaggio's ShinyBox

Technical details

- AMD Duron 850MHz CPU @ 1000MHz
- Soltek SL75-KAV
- Generic 512MB PC133 SDRAM
- Chaintech GeForce2 MX400 64MB
- CoolJag 102C heatsink
- LG 4x4x32 CD-RW
- Creative 12x DVD-ROM
- IBM 40GB HDD
- Creative SB Live! 5.1 DE
- Adaptec 2940AU SCSI
- Enermax 365 Watt PSU
- InWin S506 midtower case
- 3 x Sunon 80mm fans

The Story

After 12 issues and seeing so many Hot Boxes, I could no longer remain complacent with my Box-o-Beige. Armed with a few beers (and an understanding wife), I made good the threat and reached for the jigsaw. I found that laying down masking tape on the side panel first is a good idea, so as to minimise metal shards flying across your case/self. Next step was to disassemble and spray paint: 5 coats of metallic silver, 2 coats of clear. Mmmm, silver, shiny. I had some trouble prying the front panels from the 5.25 drives, but they weren't going to hide. The painting article in issue 5 is spot on, and remember: hold the spray can at least 30cm away, don't get too close! The perspex window then went in, and a familiar sticker applied as the finishing touch. I ditched the stock CoolJag fan and added a relatively peaceful 80mm fan. Further 80mm fans furnish the front intake and the rear exhaust. My wife and friends are still scratching their heads, but how do I explain.... it's an Atomic thing.

TeXXaS' Deep Purple

Technical details

- Athlon 1.4GHz @ 1.688GHz
- ASUS A7V226 Mobo
- 512 MB Hyundai DDR RAM
- Matrox 550e Dual Head
- SoundBlaster Live! 5.1
- Sony 19" and Ipex17" monitors
- Studio DV10 Plus,
- Fireball 40GB + Fireball 16GB HDD
- 2 x 80mm intake fans
- 1 x 92mm blowhole fan
- 300 Watt PSU
- Imation 8-4-32 CDRW
- Philips 40x CDROM
- Custom paint

The Story

The genesis of Deep Purple came about when I read issue 7 Atomic MPC. An idea was born. The beige box was dismantled and the outer parts were sent to the panel beaters for a high finish 2 pack paint job. 4 coats of acrylic clear keeps this baby shining like my new Merc.

A complete upgrade from my old PII 233 @366 was then in order to match the showy exterior. This machine is used mainly for my work as a private eye and as a lot of video gets pumped through it, a high quality monitor and video card were selected. Having worked with a Dualhead now for 7 months, I can never return to a cyclops setup. A 6mm perspex sidepanel was made and 5mm deep engraving was completed by the guys at Alternative Plastics. The lighting was set to shine through the perspex at the base of the window, hit the engraving and light up like neon signwriting.... which it does. (Tax Deduction for advertising) ...Naturally it plays 'Smoke on the Water' as an opening .wav file.

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Soldier of Fortune II: Double Helix

The original Soldier of Fortune caused quite a stir on release a couple of years ago, thanks to the graphic realism of Raven Software's GHOUL engine, the generally violent nature of the game in real-world settings, and the odd publicity leak from the developer. CIA 'consultant' John Mullins will soon be back (parental lock and all) in Soldier of Fortune II: Double Helix, a game that combines the basic premise of the original with id Software's Quake 3: Team Arena engine. We had the chance to look at SOF II in the final stages of development recently and, although it's not quite what we expected, things are still shaping up very nicely indeed.

Having saved us all from atomic devastation, Mullins is back with the 'shop' to battle world terrorism – in this case hunting down a madman with a deadly genetic virus. Aided by crack shot (and medical research specialist!) Madeline Taylor, he follows the trail via Prague, Columbia, Kamchatke, Hong Kong and Jordan through a series of increasingly tough missions in some stunning environments.

SOF II also includes a basic tutorial; multiplay Deathmatch, Team Deathmatch and Capture the Flag; and an excellent Random Scenario Generator. This should be a far meatier title than the original, with some decent long-term replay value and a real chance of online success.

SOF II's interface is essentially unchanged, and the minimalist SOF HUD returns. The controls are simple, although the overall effect is let down a little by some blatant channelling that sees Mullins able to leap tall buildings but not climb over a truck. Things aren't helped much by a slightly cumbersome weapons interface and a shocking jump combination that leads to frustration at times. 14 weapons are available, along with toolkits, explosives, night vision devices, binoculars and 10 types of grenade. Ammunition and health are positioned on most levels and the right weapons turn up as needed. Firing effects look to be spot on, with both flash and recoil simulated nicely, but damage modelling is a little inconsistent at this stage.

From the first level SOF II stands out as a major technical achievement and a graphical improvement on the original. Realistic rain falls on a dull Prague evening as players work their way through highly textured alleyways and avoid spotlights that cut through the gloom. Other environments, such as jungle and snow, reflect the same attention to detail in the campaign, but they are surprisingly bland in some random scenarios. Motion is handled exceptionally well, with enemy soldiers reacting realistically once the shooting starts, and moving out of the line of fire if things get too hot. Sound also seems to have had a major work-over, with footsteps, voices and background noises adding to a very strong sense of tension and atmosphere.

There's no doubt that the enemy AI has been tweaked in SOF II, as the enemy tends to respond in groups now rather than as individuals, and they're much less inclined to stand up and reload in the open. They also make good use of terrain and concealed firing positions, and help often arrives from unexpected directions – generally outside the arc of the mounted machine gun you've just captured!

Each of the four difficulty levels (amateur to nightmare) is well crafted from an AI perspective, but players should expect a tough time with SOF II regardless of the setting.

At first glance, Soldier of Fortune II: Double Helix looks to be a solid improvement on the original in terms of graphics, sound, general modelling and atmosphere.

It's not the quantum leap forward we expected, as it basically offers the same gameplay and interface, but the strong emphasis on multiplay and the excellent random scenario generator should see it carve out a niche in the tight FPS market.

Given the quality of the code we've just seen, and despite a couple of surprising deficiencies, Raven Software's success story looks set to continue.

GAME DETAILS

WHY WE CARE: **Big gun toting realism, plus we really really hope that the AI is an improvement on the oiginal's 'Worst Ever'.**
DEVELOPER: **Raven Software** www.ravensoft.com
PUBLISHER: **Activision** www.activision.com
DISTRIBUTOR: **Activision** www.activision.com
PLATFORM: **PC** **DUE:** **May 2002**

Virtua Fighter IV

That elaborate, elegant, and deliciously doomed game platform, the Sega Dreamcast, has already disappeared from store shelves, along with any hope of Sega surviving in the TV game hardware market. But with game gear so powerful and so cheap these days, a platform's specs aren't as important as what you do with them. Now that Sega's software base has been freed from proprietary hardware, the genius of the company's game designers has been let loose on the wider world: Jet Set Radio on Xbox, Sonic on the GameCube, and Mr. Driller on the GBA.

For many, the most provocative development of Sega's new status as software slut is Virtua Fighter on the PS2. One of the oldest, most developed, and cherished of fighting game franchises, available on the most successful of the game consoles. Virtua Fighter boasts all the mainstays of a new sequel: more characters, more moves, more detail, more graphical wallop. But for those who know, it promises something else: more class.

Granted, there's already some stiff competition now that Tekken Tag and Dead or Alive 2 are both on the Platinum label. Tekken has ultra-realistic combat mechanics, as championed by infinite arena space, demonic parasites and Cossack-dancing robots. And let's not forget DOA's endless counters and positive female role models. VF takes the fight to the others with realistically modelled martial arts, true 3D combat, and the perennial favourite: grappling.

This is the thinking man's fighting game – pugilism for connoisseurs (nerds). The addition of a comically decrepit old man and an attractive young black girl won't hurt sales, either.

GAME DETAILS

WHY WE CARE: One of the hottest arcade games of our age, in the privacy of your own home.
DEVELOPER: Sega www.sega.com
PUBLISHER: Sega www.sega.com
DISTRIBUTOR: Sony Computer Entertainment au.playstation.com
PLATFORM: PS2 **DUE:** May 2002

Rise of Nations

We imagine there's not much RoN lead Brian Reynolds hates more than having his new game compared to the almost identical looking AoE –with the possible exception of Civ comparisons. Certainly, Brian got just a little testy when we asked him the regulation interview question about his 'influences'.

Why Brian is lukewarm with this is puzzling, for RoN is a game that looks like AoE but plays like a RTS Civ-Lite. Nothing wrong that at all. Most of the game's complexity derives from diplomatic and territorial activities. This is apparent in the most immediately obvious feature you'll notice: the territory lines. Dividing the map up with borders requiring protection is one thing, but it's another when these borders move almost constantly in RoN: they're a reflection of power, which includes economic factors, and they ebb and flow with every little event. This rules out traditional border camping with ultra heavy defenses as a tactic, instead it forces the focus to heavy hitting mobility. Borders represent more than arbitrary point scoring –they affect the game in every way –and essentially, 'if it's not in your territory, you can't use it'. That means resources. A possible scenario focuses on just one unit of a resource type on the map, with an ongoing battle throughout the game for control of it. Obviously this translates into a highly fluid, fast changing style of gameplay.

Territorial considerations extend to racial specialties. Most races, for example, take a small amount of damage when in enemy territory, just for the privilege of being there. Russians, however, take no damage in enemyland provided it's snow terrain. Neat stuff.

The developer has a big job ahead to ensure this concept works and is properly balanced, from what we saw it's all in safe hands.

GAME DETAILS

WHY WE CARE: The fabled Civ RTS may actually be a reality, if somewhat diluted in substance. And it looks like AoE.
DEVELOPER: Big Huge Games www.bighugegames.com
PUBLISHER: Microsoft www.microsoft.com/games
DISTRIBUTOR: Microsoft www.microsoft.com/games
PLATFORM: PC **DUE:** A year or so.

Final Fantasy X

The Japanese didn't invent the motor car, the cartoon show, or the computer role playing game. They did something more – they reinvented them. Made them more streamlined, sleeker, fruitier, and forged in their own unique brand of cultural semiotics. Ideas that seemed bizarre at first to us Westerners are now second-nature: cars should be fuel efficient, cartoons should have fan-service (nudity), and RPGs should have spikey-haired androgynous protagonists.

At the vanguard of console RPG gaming is the Final Fantasy series, a last-ditch gamble that spawned a multi-million dollar industry. Few games have the stature to warrant a big-budget Hollywood flop, and FF is one of them. The one series that dares to throw away its entire universe and start from scratch at each iteration, Final Fantasy is about to break into double (arabic) digits.

Final Fantasy X adheres to all the cliches of this incredibly baroque gaming genre: spunky young hero, surreal fantasy world, giant chicken steeds et al. But this certainty guarantees the fans get exactly what they want: 40-80 hours of game time, protracted boss battles, guardian force spells ('Aeons'), elaborate turn-based combat, a fleshed-out story, and characters that look like they just stepped out of a salon.

Fans expect this already, but there are some FF firsts for number ten. It's the first on 128 bit hardware, and the first on DVD-ROM. It's the first in the series with proper speech, too. This is a controversial move for two reasons: replacing one's internal dialogue with explicit aural content neuters dramatic impact, in the same way that films can be less powerful than books; and English dubs of the Japanese spoken word have an uncanny way of sound like over-acted bollocks – and they usually are.

Nevertheless, all the pieces are in place: saucy costumes, a compulsive mini-game (blitzball), elaborate character advancement, a nameless evil, a fantasmagorical world, and a lasting challenge. And underneath there's a real story thanks to the power of. . . linearity! Shock, horror! As Final Fantasy XI promises to be some manner of online subscriber malarky, FFX could be that last true stand-alone game in the series. In other words: the final, Final Fantasy.

GAME DETAILS

WHY WE CARE: **Hardcore RPG addiction + next-gen hardware = sleepless nights for the Square elite. Guaranteed most juicy graphics.**
DEVELOPER: **Square** www.squaresoft.com
PUBLISHER: **Square** www.squaresoft.com
DISTRIBUTOR: **Sony Computer Entertainment: au.playstation.com**
PLATFORM: **PS2** **DUE:** **May 31st 2002**

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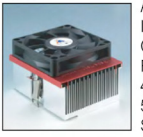

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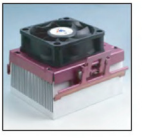

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PCI-Express

John Gillooly looks at the bus formerly known as 3GIO, now that it's a reality.

ABOVE: The 3GIO concept opens the way for modular hot-swappable PC components.

ABOVE: Intel's 3GIO modular concept PC.

After some confusing years of competition between a multitude of different potential replacements for the PCI bus, the victor has finally emerged in the form of the Intel-backed 3GIO (Third Generation Input/Output) technology. This has come about thanks to the support of PCI-SIG, the industry group charged with the care of the current PCI standard. PCI-SIG followed the long standing IT tradition of replacing cool working names with dull marketing-speak when it dubbed the technology PCI-Express.

Of course, our hot tip is that by the time it comes to market, it would have undergone subtle recapitalization and be known as PCI-eXPress.

3GIO undergoes this baptism as the PCI bus hits its tenth birthday, and despite a magnificent run (as far as local buses go), the grey hairs are just starting to show.

With this in mind, PCI-Express is designed to scale for the next ten years, taking bandwidth from the initial 2.5Gbits/sec up to 10Gbits/sec and the very limits of copper-interconnect technology (there is even talk of taking it to 20Gbits/sec). In contrast, PCI has bandwidth of 1Gbit/sec.

The PCI bus was developed in response to increasing clock frequencies for CPUs, with the major advantage over its predecessors, ISA and VESA, being that it adopted a bridge between the high frequency CPU and memory and the low frequency local bus. The asynchronous relationship enabled CPU speed to increase without interfering with the PCI bus and pushing us into complete expansion card upgrades with every jump in CPU Front Side Bus speed.

There are now several problems with PCI above and beyond the obvious bandwidth limitations inherent in the low bus speed of 33MHz. Despite work on DDR implementations of PCI, it's just not easily scaleable in frequency or bandwidth.

The other emerging problem is that with the increase in streaming media, PCI does not support the timing sensitive, or isochronous, data transfers needed for streaming sound and audio.

Seven decker bus

PCI-Express is based upon seven layers, and introduces a switch between the PCI-Express bus and the I/O hub of the chipset Southbridge. This means that only one layer, dubbed the Physical Layer, needs alterations in order to increase bandwidth for the whole subsystem.

The other six layers are responsible for packet transfer all the way up to the operating system and runtime level.

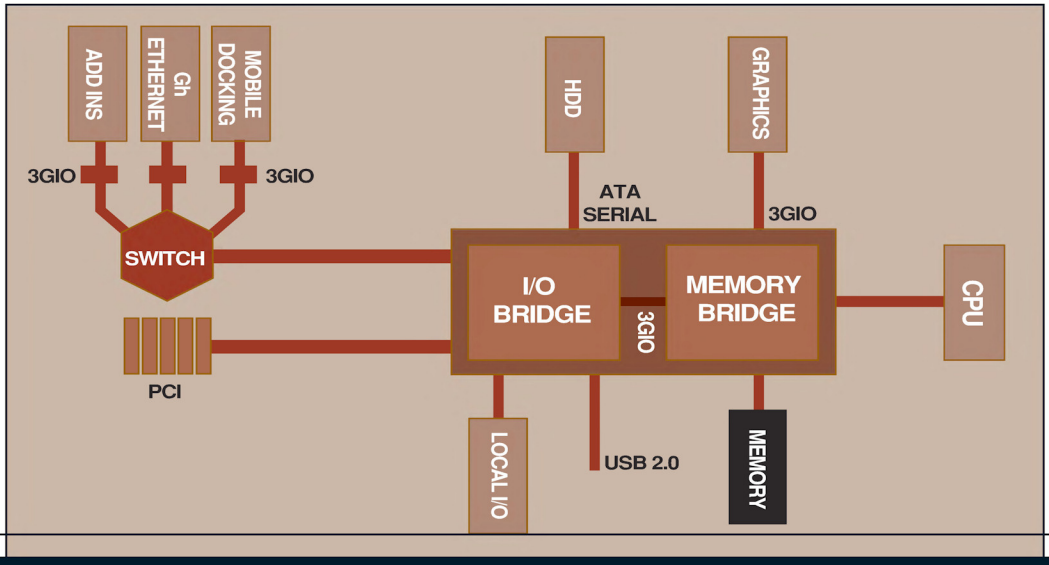
This approach also allows PCI-Express to be transparent to the operating system, which thankfully means no special drivers are needed to get the sucker working smoothly.

The Physical Layer

The fundamental building block of 3GIO is known as a 'lane'. This consists of two signals: send and receive, which transfer 2.5Gbit/sec each way. The number of lanes can be scaled easily for peripherals with a larger than average hunger for bandwidth. In fact, the first implementations of PCI-Express that us commonfolk will see next year is when it replaces AGP as the preferred connection for graphics cards. This will most likely appear as a four lane PCI-Express connection, which is enough to deliver the bandwidth needed by the next generations of 3D cards (major players NVIDIA, ATI, 3Dlabs and Matrox have all contributed to the development of the final 3GIO/PCI-Express specification).

To accommodate this higher bandwidth a special cartridge style add-in card is envisaged which will plug into two sets of connectors on the motherboard. These connectors are aligned much like the old shared ISA/PCI slots, with one mounted directly above the other but sharing the same slot on the back of the case.

These slots will have an added advantage for those who use integrated video chipsets. Unlike AGP, the PCI-Express graphics slot will be compatible with single-lane connections, allowing it to be used for general connections if not needed by the graphics hardware.



ABOVE: The major change made by 3GIO to the system architecture comes with the inclusion of a switch between the I/O bridge and the expansion cards.

Data link layer

In order to ensure reliable data transport, the data link layer sequences and adds a CRC (Cyclic Redundancy Code) to each packet. This layer is also responsible for controlling the flow of data, a big part of the isochronous nature of PCI-Express.

Transaction layer

Any data that is dealt with by a card sitting in a PCI-Express slot needs to make the jump from software to hardware and back again. This is where the Transaction layer comes into play. It adds extra memory addressing space for messages, eliminating the need for the sideband messages used with PCI. Sideband messages are sent on the outside edges of the signal travelling down the wire.

Software layers

The remaining two layers deal with initialisation and run-time. When you boot your OS, the PCI bus currently goes through initialisation: the period of time when the operating system discovers what hardware is hanging off the bus and doles out precious system resources. This model is unchanged within PCI-Express, partially because there was no need to update the model, and also to ensure seamless compatibility with existing operating systems. In fact, the working group behind 3GIO has made the guarantee that it will boot any current operating system without any specialized drivers. The run-time layer deals with how software interfaces with the hardware. It will also be unchanged from that which is currently used by PCI, however it is possibile that software will take advantage of new features within PCI-Express.

One of the major sources of confusion surrounding the introduction of PCI-Express is its relationship to the other big interconnect technology, HyperTransport. Just as Intel is the driving force behind the Arapahoe workgroup that developed the 3GIO specification, AMD is the major player behind HyperTransport. At first, second and third glances this seems to indicate that we are looking at an extension of the cold war between the two CPU makers. The truth is less clear. AMD is a member of Arapahoe, and the first implementer of HyperTransport in the desktop arena, NVIDIA, is strongly behind PCI-Express as a replacement for AGP.

In a strange attempt at coexistence the two technologies are being pitched as complementary solutions. PCI-Express is simply a replacement for the PCI bus – something almost certain to happen now the PCI-SIG is firmly behind the technology. HyperTransport on the other hand is pitched for connection between chips, be it NorthBridge, SouthBridge and I/O bus as seen in NVIDIA's nForce or AMD's implementation for multiprocessor systems using the SledgeHammer CPUs.

Of course, these things are never that clear. While HyperTransport will probably never be seen as a PCI-style bus for add-in cards, PCI-Express may well flow over into taking up the inter-chip connection role that HyperTransport wants to own. This will most likely be seen in Intel's chipsets, which are almost certain to make maximum use of the research dollars that it has pumped into the development of 3GIO.

We don't have too much longer to wait until we see PCI-Express appearing on boards. It is due to make a serious impact in the second half of 2003, coming after the complementary Serial ATA hard disk connection technology roll out later this year. This will complete the current swag of alterations to how our systems work, with Serial ATA, USB, IEEE1394, DDR RAM, and PCI-Express all helping to clean up a lot of the legacy architecture that clutters our systems.

Intel has already started looking at the technology needed for the replacement, and it requires a move away from copper-interconnects into a purely optical subsystem. It is expected that this technology will reach maturity within ten years from now, when forecasts indicate that PCI-Express will be pushing copper technology to the limit. But until then, it will become a big part of our tinkering and tweaking lives.

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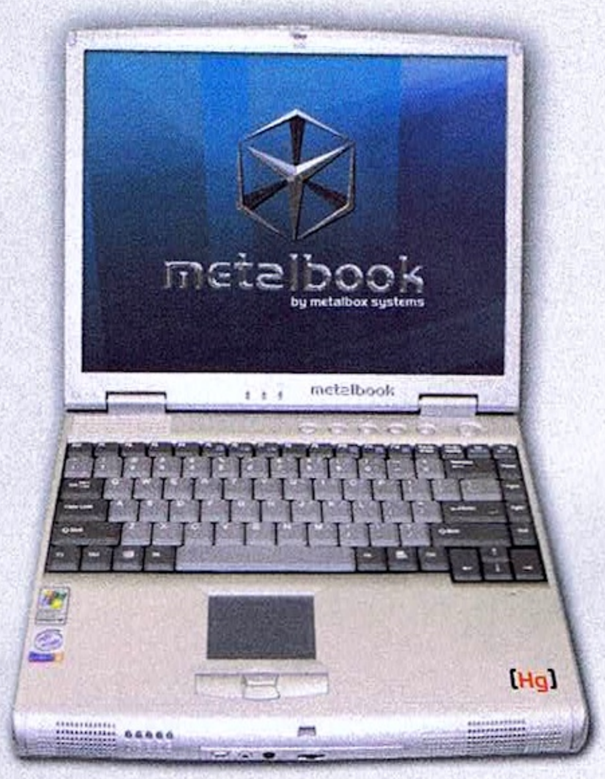

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Speed for the masses

With the advent of IDE RAID, one of the sexiest PC things is now also eminently affordable. Ashton Mills lines up the competition to see how different implementations perform.

As Atomicans you were born knowing about RAID, so we don't need to give you the full run down. But it is worth reminding ourselves just how sweet this technology is – for example by randomly throwing the word 'RAID' into every day conversations ('Hello Ashton, I'm the President of the United States of...**RAID!!!!**') or by giving you, our beloved readers, a big fat stat-filled feature you can paw over with moist tongues and rigid trousers (what? Am I the only one who chooses to read Atomic this way?)

Afterall, despite advances every year in the world of magnetic storage, the bottom line is that your hard drives are the biggest bottleneck in your machine. Every time you boot up, every application or game you load, you're waiting on your drives. Until the day we get insanely cheap NVRAM, we have to do the best with what we've got – which is precisely what RAID is all about. Instead of waiting around for drives to get faster and faster, you can substantially increase the speed of your storage subsystem *now* by combining two or more drives together to perform as one, aka the glory that is RAID 0.

Yes RAID can also be used to preserve data through mirrored or parity arrays, but we're Atomicans, we care about *speed* and *power* and *gigantic liquid nitrogen cooling rigs that double as bar fridges*. So when it comes to RAID what we really want to know is what sort of read and write speeds we can achieve, especially in relation to affordable IDE gear. Of course, the faster, the better.

Line 'em up

RAID is so accessible now you don't even need a RAID controller to take advantage of it. The Windows NT/2K/XP line and Linux all allow you to create software RAID arrays easily, and even today's low end CPUs will barely notice the extra processing load that's involved.

Which begs the question: Which is better? How does software RAID cut it versus the hardware solutions? And, for that matter, which of the hardware solutions performs best?

It was the under pretence of answering these vital questions that we got in loads of expensive equipment to play with. So for your pleasure and ours we've pitted the latest inbuilt ATA133 IDE RAID controllers by Promise and HighPoint and some Maxtor ATA133 drives against both a software RAID implementation and – just 'coz we can – a high-end SCSI RAID solution consisting of an Adaptec cached RAID controller and some beefy Seagate Ultra 160 15000 RPM drives (which get so hot you can cook your breakfast on them). Suffice to say we all brought along a spare pair of pants in anticipation of the final results.

So, if you haven't already, check out the results table to see how each of the implementations performed.

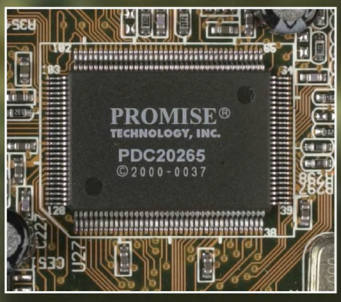
Murpheyisms

While the results speak for themselves, it took us a while before we got to see some of the pants-soiling scores in the table. In the process of benchmarking our configurations we uncovered a number of technology foibles.

We had initially planned to use two Seagate Barracuda IV drives. On their own these drives perform at around 42MB/s. However, when RAIDed they scored far lower than a single Barracuda IV drive. According to Seagate this is due to the drives being 'too fast' for RAID controllers to handle, but we noticed the same problem with software RAID as well. Seagate has confirmed that these drives simply will not work well in RAID setups and that a fix may be in the works. In the meantime, if you plan to RAID, don't rely on the Barracuda IVs.

Another hurdle we encountered was with our VIA based Shuttle motherboard – originally the RAID 0 scores of the Maxtor drives were coming in some 20% under our expectations. As it happens there is a well-documented latency bug in certain VIA chipsets that causes the throughput of IDE RAID solutions to perform under par. So prolific is the issue that VIA has released an official fix, inspired from a patch written by one George Breeze. George was the man who first drew the public's attention to the problem and then, bless him, he went ahead and fixed it! After application of George's 19d latency patch we achieved the scores you see for the for the HighPoint RAID controller.

This is rather unfortunate given that VIA chipsets can now be found on a majority of motherboards currently available, including those supporting onboard RAID via Promise or HighPoint embedded controllers. If you plan to



ABOVE: A PROMISE RAID controller. Incredible.

ABOVE: An Adaptec RAID controller. Sexy!

ABOVE: A HighPoint RAID controller. Woot.

RAID using a VIA based motherboard, even if it's using a plug-in PCI-card, be sure to grab George's latest patch from www.networking.tzo.com/net/software.

XP and SCSI

Other interesting problems we encountered were some disappointing scores for our SCSI array: performance *fell* by 13%. We spent quite a few days fiddling and tweaking motherboard, BIOS, and RAID configurations but the benchmarks kept coming back well under the scores of a single SCSI drive. Our fantasies of showing off blistering read scores to impress girls didn't materialise.

It turns out the fault lay with Windows XP. We had suspected this, especially given the proliferation of reports online by users experiencing poor SCSI RAID performance under Windows XP, but it wasn't until we contacted Microsoft directly to get the low down that this issue was confirmed. Microsoft sent us a beta patch the final of which will be included in the next fixpack. As you can see, the ATTO scores aren't too shabby (What's this? A measly 111MB/s read speed? More more!) but the PCMark and Sandra scores are still a little low. None-the-less it's a big improvement over the performance drop we initially saw, and we hope Microsoft continues to work on the issue.

Facts and features

Let's get down and dirty with the numbers. The result table tells all: IDE RAID is clearly a gift from the geek gods. The ATTO scores peak at a fantastic 99% increase in raw read speed for the HighPoint array, while the 'real-world' tests of PCMark and Sandra show the Promise coming out in front with an 64% and 43% increase respectively. A top throughput of 83MB/s is superb given the simple addition of a cheap IDE RAID controller with standard, affordable, IDE drives. Most RAID capable motherboards are only around $50 more than their RAID-less counterparts, and the Maxtor D740X-6L's used in our tests retail for around $250. Plug-in PCI RAID cards from Promise or HighPoint can be had for a similar amount. Compare this with approximately $1100 for the Adaptec 2110S and $1200 each for the 15,000RPM drives.

Of course it's possible to achieve even greater speeds by adding a third or fourth drive to the array, but the gains are not exponential. Two drives give you

Suppleware

While the Promise and HighPoint cards are clearly not software solutions, strictly speaking they are not, in fact, hardware solutions either. You could say they sit somewhere in the middle. Unlike the SCSI controller used in our tests with an onboard processor, the IDE RAID controllers leave much of the processing up to the system's CPU via the drivers. Because of this, such IDE RAID products have been termed 'firmware' solutions, much to the chagrin of companies like Promise who hotly debate the issue.

But keep in mind this is precisely why Promise and HighPoint can offer these RAID controllers at such an affordable price, especially when compared to the other solutions. By taking advantage of the system's CPU they can reduce costs on the controller chips and cards. The saying you pay for what you get holds true, even in the world of RAID.

Under load

Software RAID, as the table shows, is the most demanding of the different implementations for obvious reasons – but it's not an issue. Why? Because while the load is a little slice of the CPU pie for any box, apart from booting up and loading an application your storage subsystem is not in use and thus not taxing the CPU. And when it is in use, such as loading up your favourite game, you're not using the machine and don't need the attention of the CPU on the application.

The only people who need to be concerned about storage subsystem CPU usage are system administrators looking after server machines, such as database beasts. This is because these types of machines are constantly and ongoingly responding to multitudes of access requests – which brings us to that high speed demon, SCSI.

As the table shows SCSI has the lowest CPU usage of all of the types, even in a RAID configuration, and it'll stay low even in systems with sixteen devices attached to a controller.

This is partly what you pay for with SCSI, and why it is overkill for a desktop machine – it can handle simultaneous requests to multiple devices far better than IDE, and do so with a minimum of burden on the CPU.

How we tested

Given basic IDE RAID can now be found as a cheap extension on many new motherboards, and thus will be the means through which most new users encounter it, we decided to test the performance of inbuilt Promise and HighPoint controllers as opposed to stand-alone PCI cards. Apart from cost and the fact that you plug 'em in, the equivalent cards are otherwise identical to their embedded brethren.

Our testbed machine is a 2GHz Pentium 4, 512MB DDR RAM, GeForce 2 GTS, Windows XP Professional system using the following motherboards and controllers:

• Gigabyte 8IRXP Intel 845 based DDR motherboard with inbuilt Promise PDC20276 ATA133 RAID controller
+ V2.00.0.25 Promise drivers

• Shuttle AV45GT VIA266A based DDR motherboard with inbuilt HighPoint HPT372 ATA133 RAID controller
+ V2.31 HighPoint driver

• Adaptec 2110S I20 Ultra160 PCI RAID controller with 16MB onboard cache
+ V3.0A 2110S Adaptec drivers

DRIVES
• One 45G Maxtor DiamondMax Plus ATA100 7200RPM IDE Boot drive
• Two 60G Maxtor Viper D740X-6L ATA133 7200RPM IDE drives
• Two 36G Seagate Cheetah X15 Ultra160 15000RPM SCSI drives

All partitions formatted NTFS for testing.

Wot about Linux?

Being Atomic, we planned to test the software RAID capabilities of Linux in addition to Windows. But much to Brad the web monkey's dismay, we could not.

The current Linux kernel supports both ATA100 based Promise and HighPoint chipsets, the PDC20265 and HPT370, but it currently does support the new ATA133 solutions tested here. This is a pity because software RAID under Linux is quite mature and offers the full gamut of RAID levels. In addition, through being able to boot the kernel from a separate partition, it's possible to install Linux onto a software RAID array to accelerate the OS, something that cannot be done with Windows.

You win some, you lose some. And the rest have to wait for support.

the biggest jump in performance, with subsequent drives increasing throughput at a reduced rate. Unless you're doing some serious disk-intensive task such as video editing, gains top out at four drives, which just happens to be the limit for standard 2-port IDE controllers. If you have four identical drives to RAID, setup a 1+0, mirrored and striped array and you'll get the best of both realms.

But the real kicker here however is the software RAID results. A consistent read and write speed of 80MB/s without the need for extra hardware is drool inducing. Why bother forking out for a hardware controller at all? Ultimately it comes down to convenience. Hardware solutions offer the following main benefits over the software version of RAID:

RAID levels – Windows XP only supports striping (RAID 0), mirroring (RAID 1) and spanning (JBOD). The Promise and HighPoint onboard controllers also support RAID 1+0. Higher end cards such as the Adaptec go further and add RAID 5 to the mix.

Performance – Because the controller manages the drives as a single device you can install your OS on the array and reap the performance advantages. Under Windows software RAID you can only setup arrays from partitions on your drives after Windows is installed, and if you're serious about performance you'll need to fiddle with matching partition boundaries. Don't think you can get tricky and setup an array prior to installing – the install program won't recognise it. You can create an array for all your movies, and MP3s, but not for the OS itself.

Compatibility – With Windows XP's software RAID you need to convert your drives to 'dynamic disks'. Those running dual-boot systems will find this makes them incompatible and unreadable to other operating systems (such as Linux), including previous Windows versions.

More ports – By virtue of having another controller in the system you will have space for another four, or even more, IDE devices.

Take your pick

If you've got two identical drives, and you want to boost your system performance, RAID delivers. You can't go wrong with Promise or HighPoint if you're interested in laying out for a hardware solution, but if you've got XP Professional save your cash and use software RAID because it does the job admirably. If you're really hanging out for hardware RAID wait until your next mobo upgrade to get it on the cheap.

Simply striped

All the results you see presented in the table were achieved using a standard stripe size of 64KB.

If you're using your machine for tasks which involve large files, such as the classic example of video editing, a larger stripe size of 128KB or 256KB will provide better performance. Conversely, if your machine is going to be doing a lot or working with small files – which is somewhat the realm of a standard desktop PC – then a smaller stripe size will theoretically reap greater speeds.

We tested this by creating RAID 0 arrays with both 16KB and 32KB stripe sizes on the HighPoint controller (note embedded Promise controllers use a 'Lite' BIOS that doesn't allow stripe size selection). The results? The 32KB tests only showed a negligible difference.

The 16KB tests showed a slight increase of about 2% for the PCMark and Sandra tests, but no change for the ATTO marks. Nothing to write home about, but it doesn't hurt if you want to squeeze every last drop of performance out of your box.

Benchmarks

ATTO: ATTO measures raw throughput irrespective of the OS cache and does so for a variety of block sizes. For our purposes we wanted to get an idea of the throughput ceiling for the arrays and benchmarked using 1MB blocks on the maximum 32MB test file. ATTO can be downloaded from www.attotech.com/software/index.html.

PCMark 2002: MadOnion's latest benchmark provides a real-world performance comparison utilising tests such as file copying. PCMark 2002 can be found at www.madonion.com.

Sisoft Sandra 2002: Sandra is well known for its CPU and memory bandwidth tests, but its disk tests are also a good guide for performance. Sandra can be downloaded from www.sisoftware.demon.co.uk/sandra

Intel's IOMeter: Normally reserved for benching servers, the CPU usage result comes in handy for our tests. You can grab this nifty little benchmark at sourceforge.net/projects/iometer.

RAID 0 results stripe size 64k	IDE – Maxtor D740X-6L 7200 RPM				SCSI – Cheetah X15 15000 RPM	
	Single Drive	Promise ATA133 Hardware RAID 0	Highpoint ATA133 Hardware RAID 0	Windows XP Software RAID 0	Adaptec 2110S Single Drive	Adaptec 2110S Hardware RAID 0
ATTO 2.02 W MB/s R	41120 41855	64373 (56%) 76783 (83%)	71902 (75%) 83261 (99%)	79512 (93%) 80082 (91%)	57128 58738	109757 (92%) 111054 (89%)
PCMark 2002	866	1423 (64%)	1299 (50%)	1376 (59%)	1229	1389 (13%)
Sandra 2002	26338	37756 (43%)	37233 (41%)	36402 (38%)	41247	55721 (36%)
IOMeter CPU	~5%	~8%	~8%	~11%	~4%	~4%
	RED Fastest scores among IDE RAID comparisons % Percentage increase over single drive scores				BLUE Highest scores across the board	

Single drive software RAID 0 tests conducted on Shuttle AV45GT utilising the VIA266A chipset IDE ATA100 controller

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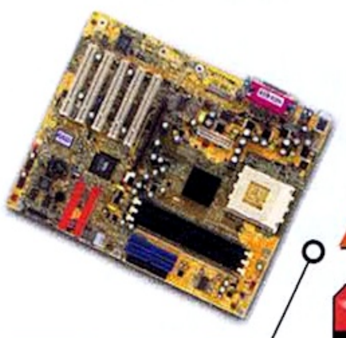

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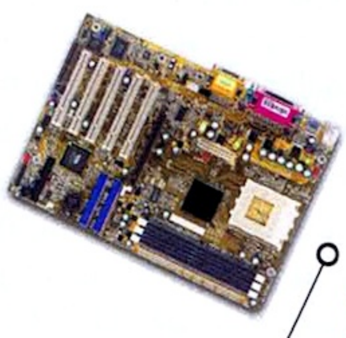

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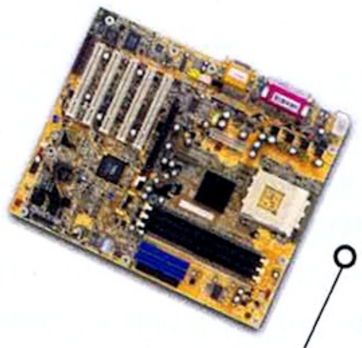

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Army tech: digital AUGmentation

Elvis wasn't the only one who liked shooting guns at screens. John Gillooly goes one better.

An outdoor firing range is a tried and tested military training tool. It is a place where skills are learned and honed, and when the crunch comes the ability to shoot accurately is one of the most important skills a soldier can have. The big problem is that if there are problems, they can be difficult to diagnose and remedy.

The smell of cordite may be missing, and the gunfire sound appears from speakers mounted on the wall, but for all intents and purposes, the Australian Army's WTSS (Weapons Training Simulation Systems) centres are high tech versions of the firing range. These centres, which are now spread across Army facilities in eastern Australia, have become valuable training tools for today's soldier.

At the core of the WTSS setup is some very familiar technology: each centre employs a combination of projectors, cameras and modified weaponry to closely represent real world firing ranges and training scenarios. These are driven by specialised interfaces for the weapons, custom circuitry and humble PCs. The installations are supplied under contract by FireArms Training Systems (FATS) Australia, part of an American parent company that cut its teeth developing police simulators – its initial military deployment was for the US Marine Corps and since then similar technology has been used in the USA and around the world for infantry training.

Like an 'analog' firing range, this digital version is divided into lanes. The standard number is 12, however a 24 lane centre is currently being built at the Army Recruit Training Centre at Kapooka. For range shooting, the three projectors each support four shooters, while for CGI scenarios, the projectors can work together to produce a single 15 metre wide image for use by varying numbers of soldiers.

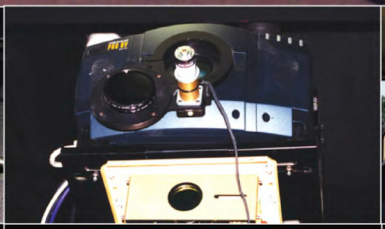
The setup uses three PCs connected by an HLA link (High Level Architecture), a US pioneered program to develop an IEEE standard for linking military simulators. Each PC is powered by an 866MHz Pentium III chip, 384MB of SDRAM and a GeForce2 GTS, running Windows 98 (FATS has investigated the use of more powerful GeForce3 level cards as well, but has run into hardware and software compatibility issues). This is combined with a custom 'shot calculator', a chip known as a Real Time Processor (RTP) and the weapons interface.

The weapons are bona fide assault rifles and machine guns that have been stripped and rebuilt containing the circuitry, sensors and gas recoil mechanisms needed for the full WTSS experience. Each centre has 5.56mm Steyr AUG Assault Rifles, 5.56mm FN Minimi light machine guns and 7.62mm FN MAG58 machine guns. These are all connected to the weapons interface via thick

ABOVE: The WTSS control station allows the range operator to have full control of the scenarios.

ABOVE: This is perhaps the second most fun thing you can do while sitting down.

ABOVE: The Steyr AUG is the main weapon used in the WTSS.



cables, which are the only noticeable external changes to the guns. In the end the Steyr ends up within 5% of its fully loaded field weight.

Inside the Steyr there are four sensors, each with an important measurement role. The sensors measure elements such as: butt pressure (stop sniggering), which shows whether the rifle is being properly braced by the shoulder; barrel movement, handy for demonstrating on screen exactly how breathing is effecting aiming; how vertical the gun is, to help eliminate aiming errors caused by the gun being tilted; and trigger operation. When the trigger is pulled, the gun fires a laser which is picked up by a camera mounted under the projector. This allows instant onscreen feedback showing where a shot has landed.

The guns may be crammed with sensors instead of ammunition, but the WTSS facilities operate with strict adherence to normal firing range procedures. Weapons handling is an important part of this. Each gun is treated like it is loaded, and the drill of safety on, load, action, release, safety off, fire, safety on is quickly drummed into the memories of all participants.

Firing range operations involve yellow 'paper' targets at various distances, each set against an image of a real range. There are a variety of stages through which range users progress, starting off with zeroing the weapon and then incorporating a variety of firing positions and distances. Above each lane is a close up of the target, allowing for real time display of hit locations.

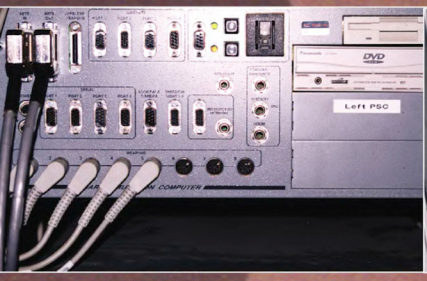
Besides the firing range, the other main feature of the facility is its ability to display computer-generated scenarios. These work in a similar fashion to many arcade shooters, with the terrain moving along by itself. Range operators have control of the scenario and can simulate everything from weapons jamming to rainstorms with a click of the mouse. These CGI scenarios are based upon real digital terrain data that has been imported into the software via 3D Studio Max, and while they're highly effective, they are well behind the levels of graphical detail seen in modern 3D games.

Of course, there are many who initially approach their allocated time in the WTSS facility as a game, something they rapidly learn is far from the truth. It is an important feature of the Army's training program, and at around one million dollars a centre it ain't your local Timezone.

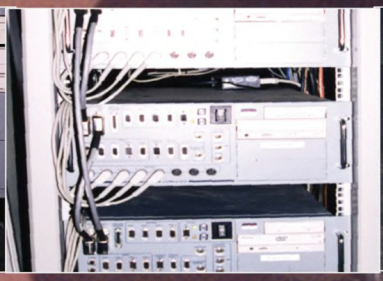
In the short period they have been operational, the WTSS centres have almost doubled the amount of weapons handling training that soldiers receive, while the inbuilt diagnostic tools continue to help catch shooting problems early on so that appropriate corrections can be made.

The centres are being upgraded on a regular three to four monthly basis, and upgrades have already added support for nighttime operations in which soldiers can use standard night and thermal vision devices to interact with what appears to be a blank screen to those without the equipment. In terms of military simulation the next big challenge is work on standardised terrain data and other interoperability features, so that facilities like WTSS could feasibly be linked to flight and armour simulators in order to create a distributed virtual battle environment for training on a grander scale.

Atomic would like to thank Captain Jason Logue, Major Grant King and the staff of the WTSS centre at Holsworthy Barracks for organising our visit.



ABOVE: Driving the range is a normal PC with custom interface.



ABOVE: These three PCs drive the WTSS range, each controlling a single projector and hit camera.

ABOVE: From top to bottom: FN MAG58, FN Minimi and Steyr AUG.

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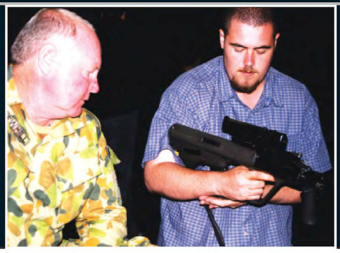
ATOMIC REVIEWS

REVIEWS

The mall of the Gods

Of all the pastimes on Earth, you would think that a hardware shopping spree in Taiwan would be a one way ticket to bankruptcy for John Gillooly.



I recently had the good fortune to make a pilgrimage to the hardware Mecca that is the city of Taipei in Taiwan. In the precious few free hours that I had, my travelling companions would probably have liked to check out some museums or other touristy locations, but my mission was clear: cheap computer hardware was to be had.

After a white knuckle cab ride dodging motor scooters in the complete chaos that is Taipei traffic, I found myself standing in the middle of Kuan Hwa Square: the sort of district that us hardware fans wish existed in every city and town on the face of the planet. After watching some brave soul (or maybe insane – I find it is hard to tell the difference nowadays) strap a boxed 21in CRT monitor onto the back of a motor scooter and then take off into the traffic it was time to do some serious hardware shopping.

The main computer market in Kuan Hwa is a chaotic place with dozens of stores cramming an insane amount of hardware into two metre wide booths. Among the seething mass of humanity it is a pitched battle to move forward and actually see the wares on sale. The rest of the district consists of row after row of shops displaying hardware with a reverence normally reserved for high-priced jewellery in Australian shop windows. All around are billboards advertising the gamut of computer hardware.

It soon became obvious that while there is nothing in Australia that comes close to these endless rows of stores pimping desktops, notebooks, TFTs, CRTs, motherboards, CPUs, RAM, cases, heatsinks, video cards, sound cards, CD Burners, power supplies, hard drives, keyboards, mouses and other assorted peripherals it dawned on me that pretty much all the products on sale were freely available back home. Understandably, they were slightly cheaper in Taipei thanks to the lack of freight costs, but the range was almost identical.

Apart from the first retail sighting of the ABIT AT7 motherboard, the sexy Triplex silver PCB video cards and some high tech mobile phones, the 'next big thing' was nowhere in sight. In fact there were some notable absences. While a small number of stores stocked Triplex GeForce4 Ti4600 cards (which come in a snazzy briefcase-style presentation box), this was the only appearance that the high end NVIDIA chipset made. Pretty much all the video hardware for sale was based around budget chipsets, of which the GeForce2 MX and GeForce4 MX were by far the most common. Even ATI's RADEON was virtually absent from the shelves; in fact there were more cards based on the RAGE range of graphics chips on the shelves than RADEONs.

SDRAM was a rare sight indeed, with PC2100 DDR RAM the most common. PC2700 (DDR333) was out in force, with both KingMax and Transcend having a strong presence, but surprisingly enough the pricing was fairly similar to that in Australian stores.

There was not a beige case in sight. The cases made by CoolerMaster are still the top of the heap in design and price, but there is an amazing range of budget cases for sale in Taipei, with the brushed Aluminium look being all the rage. The silver casing trend continued with the range of monitors that are available. Apart from my lone CRT on a scooter sighting, stores were almost exclusively selling TFT screens, demonstrating that a move away from CRTs is happening in earnest in the Taiwanese market.

Perhaps the most striking thing was the total and utter failing of AMD's Model Numbering system for the Athlon XP and MP processors. As we are all acutely aware, the AMD philosophy of Megahertz meaning nothing in modern CPUs has led to the CPUs being branded with a number rather than the traditional core speed naming conventions. However, in the stores of Kuan Hwa, Athlon XP CPUs are universally advertised with incorrect Gigahertz numbers rather than the proper model numbers. For example, the Athlon XP 1800+, which runs at 1.53GHz was being advertised as an Athlon XP 1.8GHz. This was made all the more surprising by the fact that Intel CPUs were being advertised meticulously, with appropriate distinctions being made between the Willamette cored 2GHz Pentium 4 and the Northwood cored 2AGHz P4.

This has not been a noticeable problem in the Australian market, despite serious concerns when the Athlon XP was launched, and it is highly surprising to see it falling over in one of the more technically savvy markets for PC components.

I was as surprised as anyone, and just a little disappointed, when I dove into a cab to head back to the hotel, leaving such an amazing place for hardware shopping with my finances intact. Actually, I lie. The street vendors were selling some pretty mean snacks.

Atomic Benchmarks

The way we do the things we do.

Here at Atomic it is our primary intention to give you the final word on the latest in hardware and PC technology. An integral part of determining the performance of a particular piece of hardware is benchmarking, and this is something that we take very seriously in the Atomic Labs.

SYSmark2002

SYSmark is a product of the collaboration between industry group BAPCo (www.bapco.com) and MadOnion.com (www.madonion.com). It is one of the next-generation application benchmarks and is designed to more accurately replicate the day-to-day workload that a system is subjected to. The benchmark focuses on Internet Content Creation and Office Productivity tasks in order to generate a final rating.

SiSoftware Sandra 2002 Professional

Sandra, from SiSoftware (www.sisoftware.co.uk), is a comprehensive benchmark and diagnostics utility. It contains dozens of special module applets that retrieve detailed information about the specifications and settings of a system, by polling each component's built-in firmware or BIOS. Sandra also features a small suite of synthetic benchmarks for specific components such as CPU, memory, CD-ROM and hard disk. It also features a burn-in wizard for stress-testing overclocked systems.

3DMark2000 Pro

3DMark2000 Pro from MadOnion.com is a powerful benchmark for testing Direct3D performance, and is the successor to the popular 3DMark99 MAX. Although it is a synthetic benchmark, it uses the advanced MAX-FX 3D engine from Max Payne, which is representative of the latest in Direct3D performance and technology.

3DMark2001 Pro

3DMark2001 Pro from MadOnion.com is the next progression of the popular benchmark utility. It also uses the MAX-FX engine and heavily emphasises DirectX 8.0 functions, including programmable shaders. The results are not comparable with results from 3DMark2000 Pro.

HSF testing

To test HSFs, we use our Athlon XP test bed, which uses an internal temperature diode. SiSoft Sandra 2002 is run in looping burn in mode, with both CPU tests selected for 30 minutes before the load temperature is recorded. The CPU is then left to idle for 30 minutes before the idle temperature is taken.

Quake 3: Arena AtomicMPC Demo

Quake 3: Arena (Q3A), from id Software, is the very popular first person shooter representing the latest in OpenGL gaming technology. Q3A has a built-in benchmarking utility and built-in demos that can test graphics card performance. These demos are fairly simplistic, and are not representative of the worst conditions that the game can offer to a graphics card. So we developed our own AtomicMPC Demo that pushes the hardware as far as possible.

Other benchmarks

Sometimes we need to break down the tests into more specific areas, such as hard disk performance, or a particular facet of 3D like T&L or SSE. For these specific purposes we can draw on a vast number of applications, games and dedicated benchmarks such as CD Speed 99, DisplayMate, Dronez, MDK2, Adaptec ThreadMark, or Serious Sam. We also use a Lian Li temperature probe from Anyware (www.anyware.com.au) for tests that involve the measurement of temperatures, such as HD heatsinks.

Atomic testbench specs

Both systems are running Windows XP Professional with DirectX 8.0a, as well as the latest official NVIDIA drivers.

- **AMD Athlon XP 1800+ system – ASUS A7V266-E motherboard (supplied by Cassa: www.cassa.com.au)**
- **Intel Pentium 4 2GHz – ABIT TH7 RAID motherboard (supplied by ABIT: www.abit.com.au)**

Common components

- **Samsung 256MB PC2100 DDR-RAM (supplied by Cassa)**
- **Samsung 256MB PC800 RD-RAM (supplied by Cassa)**
- **Hercules Prophet II GTS 32MB (supplied by Guillemot: http://au.hercules.com)**
- **20GB Ultra DMA/100 7,200rpm hard disk drive**
- **Hercules Prophet II GTS 32MB (Supplied by Guillemot: www.hercules.com)**
- **Sound Blaster Live! Player (Supplied by Creative Labs Australia: www.creaf.com)**
- **ASUS 52X CD-ROM (supplied by Cassa)**
- **Belkin PCI FireWire card (supplied by Belkin: www.belkin.com.au)**
- **Belkin PCI USB 2.0 card (supplied by Belkin)**

Benchmark settings

3DMark2000 Pro

- **1,024 x 768, 16-bit colour, 16-bit textures, 16-bit Z-buffer, triple frame buffer**
- **1,024 x 768, 32-bit colour, 32-bit textures, 24-bit Z-buffer, triple frame buffer**
- **1,600 x 1,200, 16-bit colour, 16-bit textures, 16-bit Z-buffer, triple frame buffer**
- **1,600 x 1,200, 32-bit colour, 32-bit textures, 24-bit Z-buffer, triple frame buffer**

Quake 3: Arena AtomicMPC Demo

All tests use Quake 3 1.27g and our custom Q3A demo recorded by the Atomic staff

- **CPU testing: 320 x 240, maximum geometry detail, minimum graphics settings, high sound quality**
- **Graphics cards: Low quality =1,024 x 768, normal quality graphics settings, sound disabled**
- **Medium = 1,280 x 1,024, maximum graphics settings, with all game sound disabled**
- **High = 1,600 x 1,200, maximum graphics settings, sound disabled**

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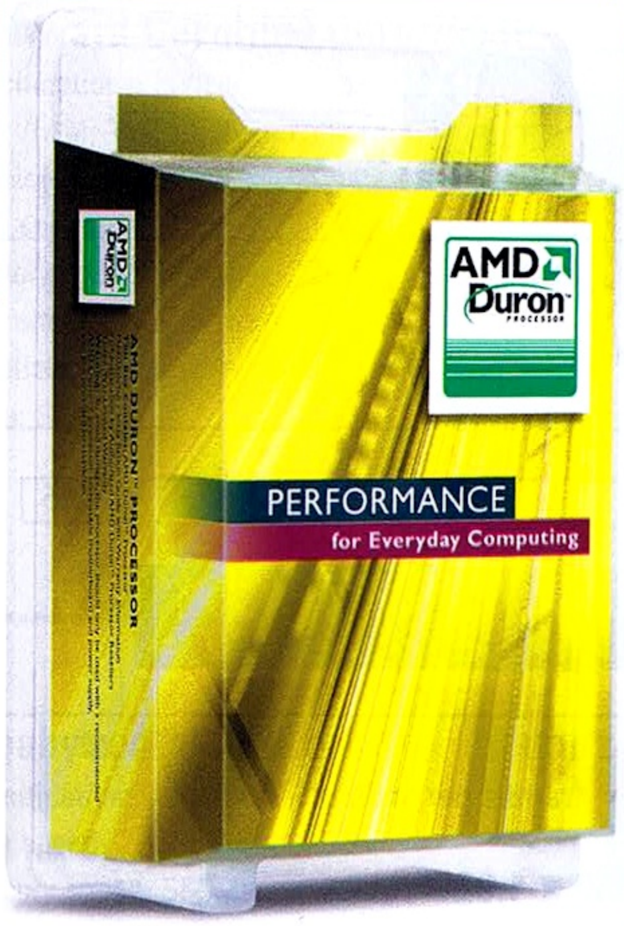
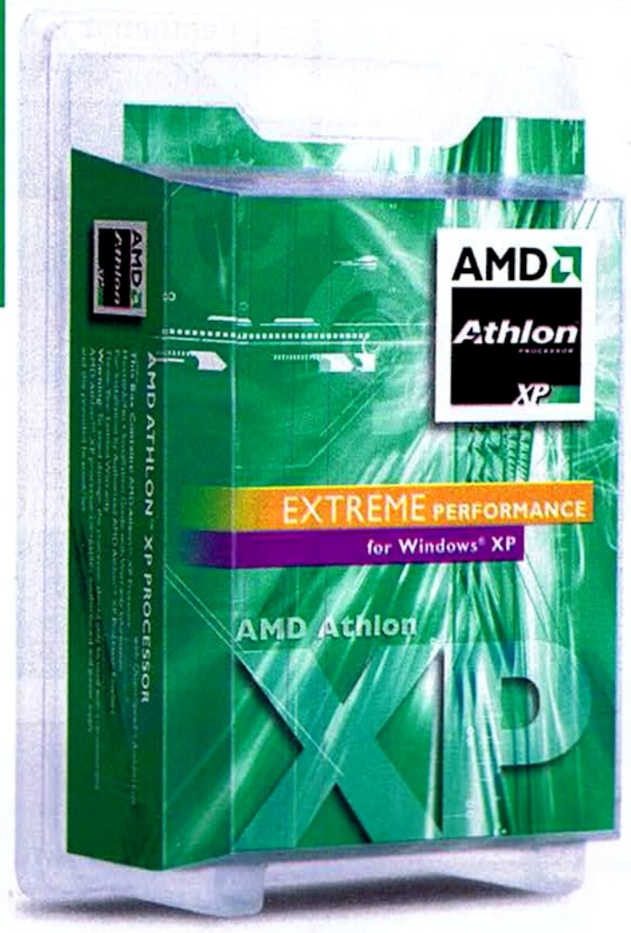
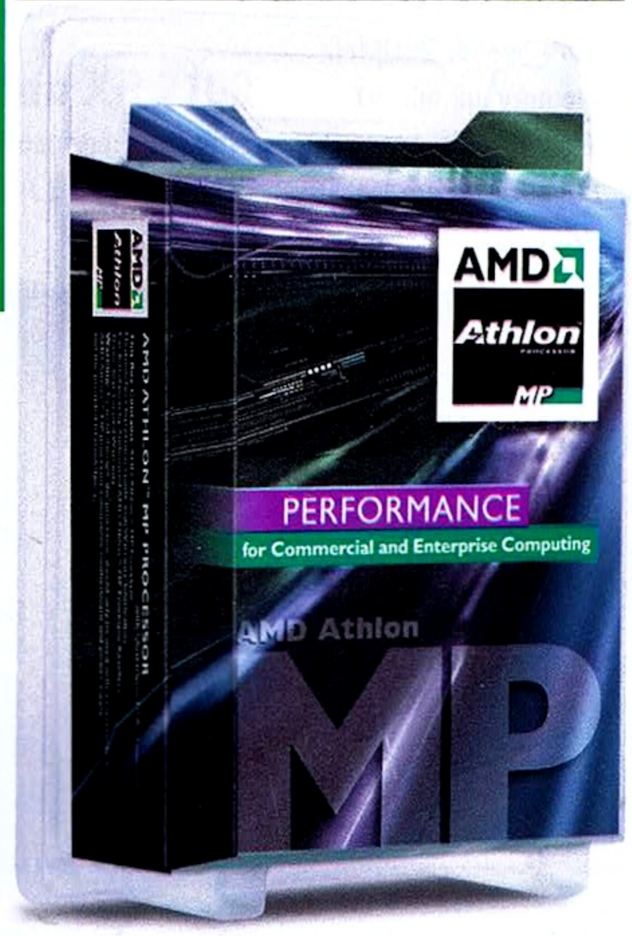


AMD ATHLON™ XP PROCESSOR



AMD ATHLON™ MP PROCESSOR



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NEW GOOD STUFF

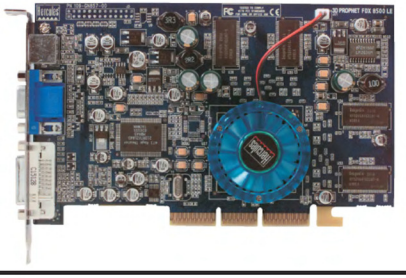
Every month more and more video cards keep flooding the market, At the same time those pesky CPUs just keep on getting quicker. In order to keep you up to date on the latest and greatest pieces of hardware Atomic presents Framerate, the new section designed to let you see just how quick those suckers really are. No full page of writing saying that the card has a purple PCB, or that the CPU is just as quick as we expect, just the lowdown on the specs, the benchmarks and the all important size of the hole that it will leave in your wallet, purse, money belt, old sock or wherever your booty may hide.

MSI G4MX460

Specifications: NVIDIA GeForce4 MX460, 64MB DDR RAM, TV-Out, TV-In, D-Sub Out.
Core speed: 300MHz
Memory speed: 550MHz
Web site: www.msicomputer.com.au
Supplier: MSI www.msicomputer.com.au
Price: $350

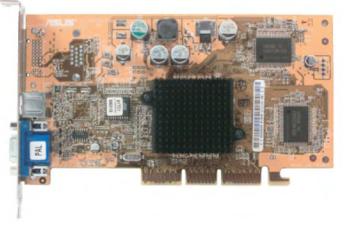
3D Prophet FDX 8500 LE

Specifications: ATI RADEON 8500LE, 64MB DDR RAM.
Core speed: 250MHz
Memory speed: 500MHz
Web site: au.Hercules.com
Supplier: Hercules au.Hercules.com
Price: $429

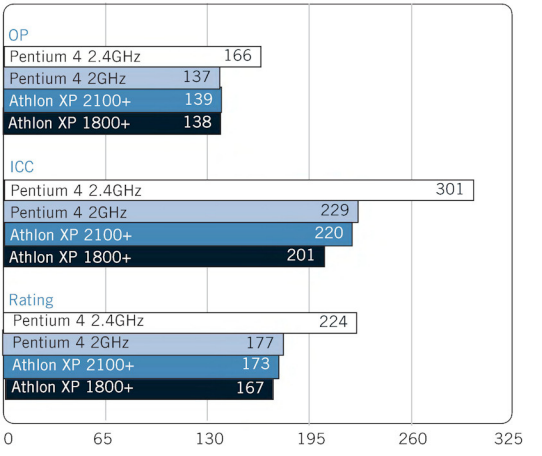


ASUS V8170DDR GeForce4 MX 440

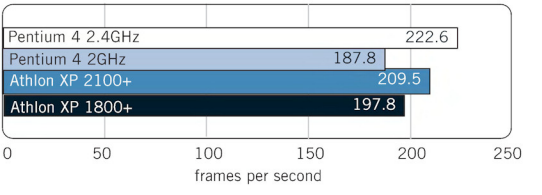
Specifications: NVIDIA GeForce4 MX440, 64MB DDR RAM, TV Out, D-Sub.
Core speed: 270MHz
Memory speed: 400MHz
Web site: www.asus.com
Supplier: CASSA www.cassa.com.au
Price: $299



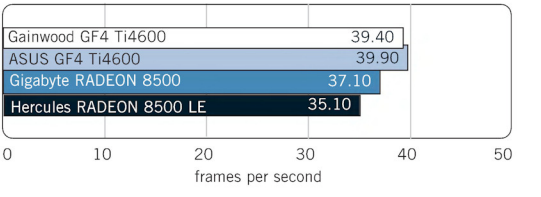
SYSmark2002 Pro



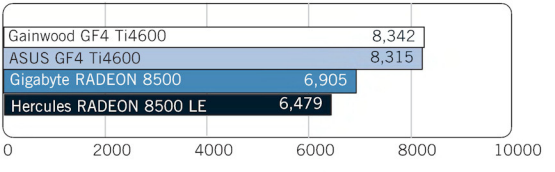
Quake 3: Arena - CPU



Serious Sam SE- 1,280 x 1,024



3DMark2001 SE Pro - 1,280 x 1,024

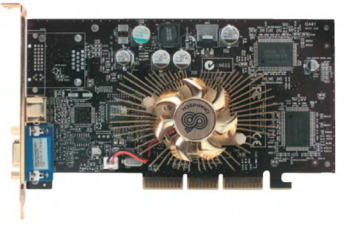


ASUS V8460 Ultra/TD

Specifications: NVIDIA GeForce4 Ti4600, 128MB DDR RAM, TV Out, D-Sub, DVI.
Core speed: 300MHz
Memory speed: 650MHz
Web site: www.asus.com
Supplier: CASSA www.cassa.com.au
Price: $949

Chaintech A-G441

Specifications: NVIDIA GeForce4 MX440, 64MB DDR RAM, D-Sub out.
Core speed: 270MHz
Memory speed: 400MHz
Web site: www.chaintech.com.tw
Supplier: Protac www.protac.com.au
Price: $299



Gainward GeForce4 Ultra/750XP

Specifications: NVIDIA GeForce4 Ti4600, 128MB DDR RAM, TV-Out, Twin DVI output with D-Sub adaptors.
Core speed: 300MHz
Memory speed: 650MHz
Web site: www.gainward.com
Supplier: Hallmark www.hallmark.com.au
Price: $899

Gigabyte AP64D-H

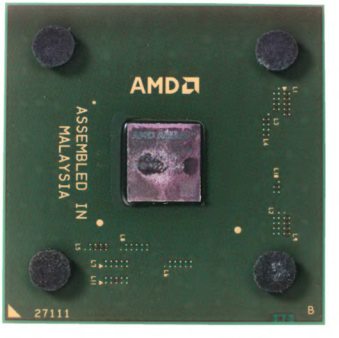
Specifications: ATI RADEON 8500
Core speed: 275MHz
Memory speed: 550MHz
Web site: www.gigabyte.com.tw
Supplier: Synnex www.synnex.com.au
Price: $529

Pentium 4 2.4GHz

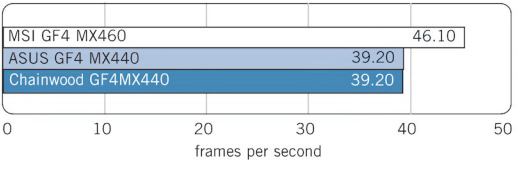
Specifications: 0.13-micron process, 400MHz FSB, 8KB L1 Cache, 512KB L2 Cache.
Speed: 2.4GHz
Web site: www.intel.com

Athlon XP 2100+

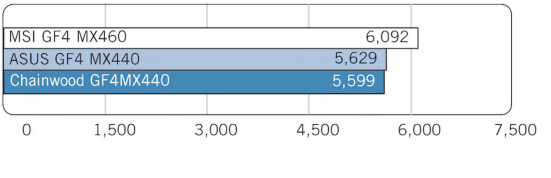
Specifications: 0.18-micron process, 266MHz FSB, 128KB L1 Cache, 256KB L2 Cache.
Speed: 1.73GHz
Web site: www.amd.com



Serious Sam SE- 1,024 x 768

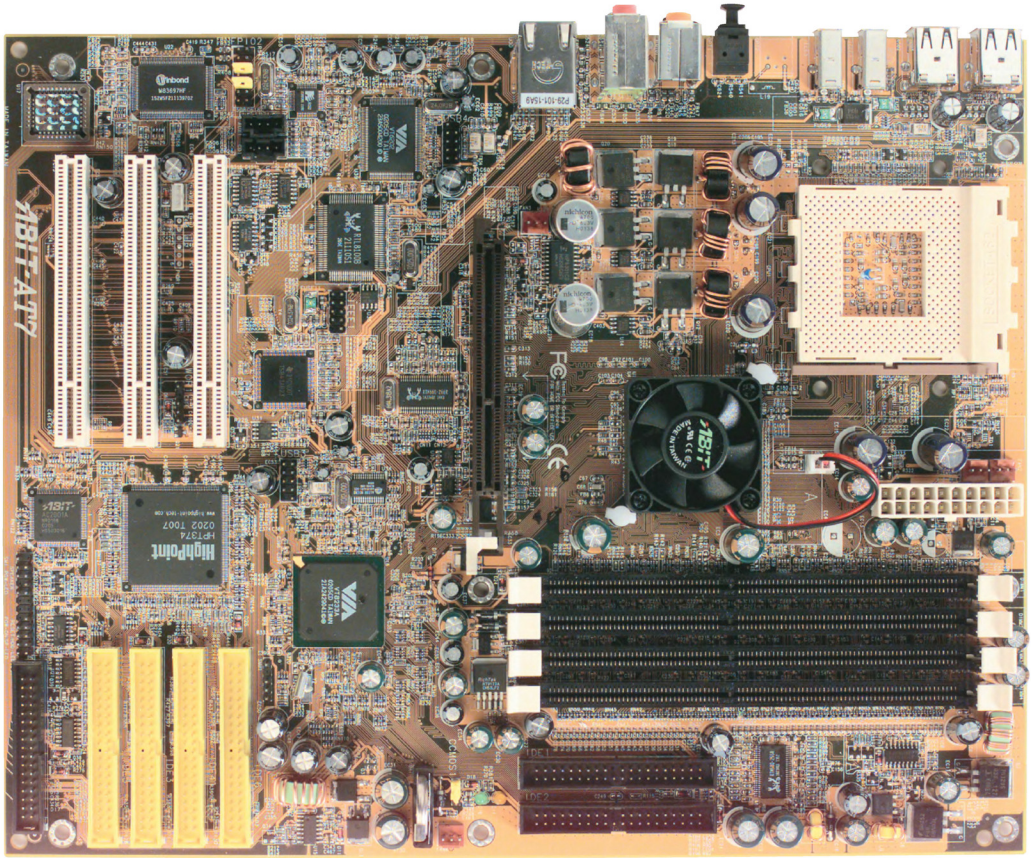


3DMark2001SE Pro- 1,024 x 768



ABIT AT7

Special Agent John Gillooly is hot on the trail of MAX, ABIT's new Serial killer.



It's a sad fact that the motherboard market has reached a point where the level of innovation has dropped. These days there is often little to differentiate boards apart from chipset and added features. Things that were rare in the past, like IDE RAID support, are now commonplace and you can expect any small innovations in features or design to be mimicked by other manufacturers within weeks.

At the same time we are dealing with boards laden with legacy features. Apart from some specialised applications, products that use USB or IEEE1394 interfaces have superseded peripherals that once relied on serial or parallel ports. In fact, apart from the occasional bout of BIOS flashing, even the ubiquitous floppy drive is making a spirited dash towards redundancy.

Notebook manufacturers have been pushing for a reduction in legacy components for some time now. Toshiba has gone so far as to drop floppy drives from a lot of its range in favour of the newer SD technology, while companies such as Sony are pushing Memory Stick as a floppy replacement. The trend is not as common in desktop systems, and while some major PC manufacturers have brought out USB only systems, it is rare to see a motherboard manufacturer produce a retail product that lacks the traditional Serial/Parallel/PS2 port combo.

ABIT has made some fairly brave moves in the motherboard game over the years and the most notable was the dual PPGA Celeron supporting BP6 board. The dual Celeron configuration was unsupported by Intel and hence the BP6 ended up being the only board of its kind ever made. The latest piece of innovation from ABIT is the MAX series of motherboards with an underlying philosophy of banishing legacy features.

MAX technology is appearing in two forms: the Athlon supporting AT7 and the IT7 for the Pentium 4. The AT7 is the first card to be released, with the IT7 to follow in a month's time.

Some kind of Parallel universe?

The AT7 has been the subject of a good thrashing in the Atomic labs. This board uses the latest revision of VIA's KT333 chipset (the IT7 will use an Intel chipset) but bears only a passing resemblance to other KT333 boards. The most notable change is the almost complete redesign of the ports on the back of the board: the Serial, Parallel and PS2 ports have been replaced by a swag of others, including four USB 1.1, two USB 2, one 10/100 Ethernet, two IEEE1394 and six channel integrated audio as well as SPDIF optical out. Thankfully, the board ships with a replacement backing plate that accommodates the new ports when trying to pack the AT7 into your case.

ABIT is also releasing a front panel known as the Media XP. (C'mon why won't someone make a big leap and not use the XP name?!) This panel has readers for Memory Stick, SD and Compact Flash media as well as two USB 2.0 ports, one IEEE1394 port, microphone jack, headphone jack and an IR receiver. The Media XP plugs into headers on the motherboard.

The other major feature is the inclusion of four channel ATA133 IDE RAID via a Highpoint HPT374 controller. ABIT pioneered the inclusion of two channel IDE RAID, and is now taking RAID to the next level.

Four DIMM slots and the controller chips take up a lot of motherboard real estate, which means that a few trade offs are necessary. The most obvious is that the board only has three PCI slots. This would be a problem on a normal board, but given the AT7 has onboard LAN, sound, IEEE1394 and USB 2.0 then a lot of the traditional uses for PCI slots are already taken care of. It is definitely something that should be kept in mind when working out if the AT7 is the right board for your needs.

Of course, the AT7 also uses ABIT's Softmenu III for overclocking and tweaking, and the BIOS is jam packed with options for squeezing the most out of your system.

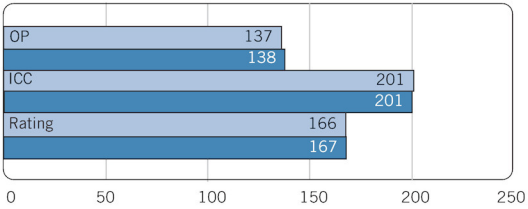
When it comes to installing the board, the major problem most people will find is that they need to get a USB keyboard. Whilst a USB mouse is the norm nowadays, most entry level keyboards still use PS2, hence extra expense to get a USB model (which will probably be packed with buttons and dials that the average user will never actually need).

Once this is sorted out, there are an almost ridiculous number of drivers to install. This is an unfortunate side effect of the board being built using so many different controllers, denying ABIT the luxury of an all in one driver package like that used for nForce based integrated boards.

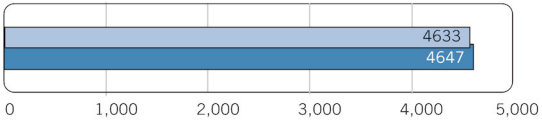
We tested the AT7 using an Athlon XP 1800+ with 256MB PC2100 DDR RAM (DDR266). This was compared to our ASUS A7V266-E based testbench. We used Madonion.com's new benchmark, PCMark2002 Pro, as well as SYSmark2002 and Quake 3: Arena using CPU settings.

As we have been seeing from other KT333 boards that we have tested, the results are remarkably consistent with the KT266A powered A7V266-E, with the difference between the boards being easily ascribed to the inherent variability in the benchmarks. The one exception to this is the PCMark2002 Memory test, in which the tweaking options on the AT7 push it ahead of the A7V266-E by about six percent.

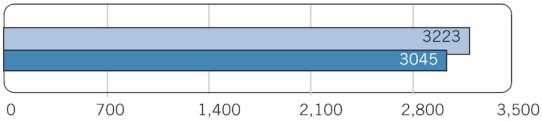
SYSMark2002 Pro



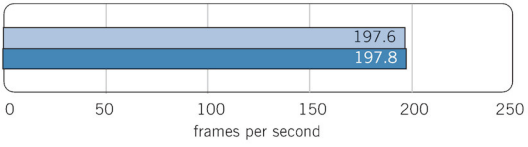
PCMark2002 Pro - CPU test



PCMark2002 Pro - Memory test



Quake 3: Arena - CPU settings



While the AT7 shows solid performance, its main advantage is the comprehensive feature set that ABIT has managed to squeeze onto the PCB — whether or not such a seemingly brave move as removing legacy ports will pay off is another matter entirely. For the vast majority of people the AT7 will be a refreshing change: with support for new technologies right out of the box right alongside cutting edge performance, this is one of the most impressive motherboards to pass through the Atomic labs to date. Now all we need to do is kill the floppy drive.

SPECIFICATIONS

VIA KT333 chipset; USB 2.0; IEEE1394; 10/100 Ethernet; 4 channel IDE RAID; 6 channel audio.

Web site: www.abit.com.tw

Supplier: Synnex www.synnex.com.au

Phone: Synnex 1300 880 038 **Price:** $439

9.5/10

Leadtek WinFast A250 Ultra TD

Thought your GeForce3 was fast? Think again says Bennett Ring.

Just when you thought your snazzy new GeForce3 Ti500 couldn't be knocked from its perch at the peak of the high performance silicon pile, along comes NVIDIA's latest and greatest to show you what frame rates are all about, subsequently sending you into a crumpled pile of lament. The GeForce4 Ti4600 has a number of new features designed to wipe the floor with all prior graphics chipsets, and the Leadtek WinFast A250 Ultra TD is the latest example of a video card based around this uber chipset.

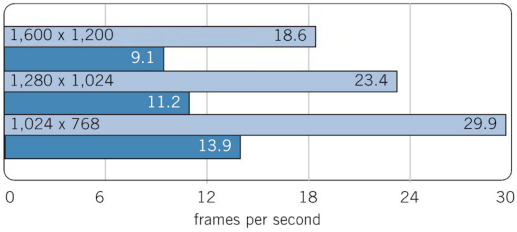
The most vaunted feature of this chipset has to be the dual vertex and pixel shader pipelines: a massive threefold increase to the maximum output of vertices when compared to the GeForce3. This equals more lovely polygons for game designers to construct higher detail models with. So what makes Leadtek's offering any different to the plethora of Ti4600s that have begun to surface over the last month or so? The most noticeable difference would have to be the massive combined GPU/RAM heatsink with its two fans. This huge hunk of Aluminium is easily the largest heatsink we've seen on a video card, and wraps around both the front and back of the video card. This obviously helps to dissipate the heat well, as we managed to overclock the memory from its default of 650MHz up to a massive 740MHz – the day when video cards ship with a 1GHz memory clock speed can't be too far away. Considering that most high-end video cards are already clocked close to their top potential speed, this 14% overclock is quite impressive. The GPU didn't fare so well, increasing by a meagre 20MHz to 320MHz.

Other than this behemoth of a heatsink, there isn't much else of note within the pack. A couple of throw away games, Gunlok and Dronez, will keep you amused for the time it takes a bee to flap its wings, while a copy of Winfast DVD might prove to be slightly more useful.

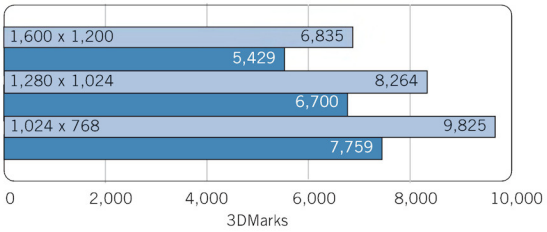
This card tested almost identically to the other Ti4600s we've had the pleasure of toying with. As you can see from the results, for current generation engines like those used in Serious Sam SE and 3DMark2001 SE, the GeForce4 Ti4600 isn't a great deal faster than a GeForce3 Ti500. However, the next gen benchmark CodeCreatures showed the potential performance difference between these two chipsets, with the Ti4600 reaching a mind blowing 115% performance increase at the lowest resolution. Even at the highest resolution the gap was still over 100%. This is the largest performance increase we've ever seen from a new graphics chipset over the previous version, but it's worth remembering that current generation games won't see a performance increase of this magnitude.

This video card is bloody fast. It also happens to be bloody expensive. And with the release of the GeForce4 Ti4400 which looks to be quite capable of being overclocked to the default speed of the Ti4600, it appears NVIDIA could well have shot itself in the foot by charging such a premium for the Ti4600. But for those who demand the fastest video card on the planet, the WinFast A250 Ultra TD stands out for its ability to be pushed harder than NVIDIA intended with its Ti4600 design.

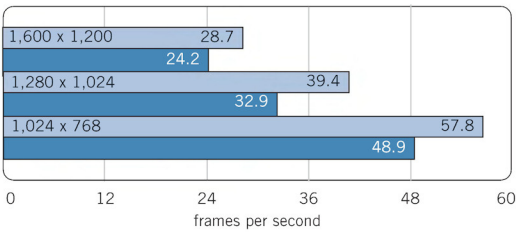
CodeCreatures Benchmark



3DMark2001 SE



Serious Sam SE Co-op Demo



Leadtek GeForce4 Ti4600
Abit GeForce3 Ti500

SPECIFICATIONS

GeForce4 Ti4600 GPU; 128MB DDR-RAM; nfiniteFX II engine.
Website: Leadtek www.leadtek.com.tw
Supplier: BCN Technology www.bcntech.com.au
Phone: BCN Technology (02) 9648 0888 **Price:** $1,050

8/10

MSI GF4 Ti4400

Can't afford a GeForce4 Ti4600? Bennett Ring possesses your medium.

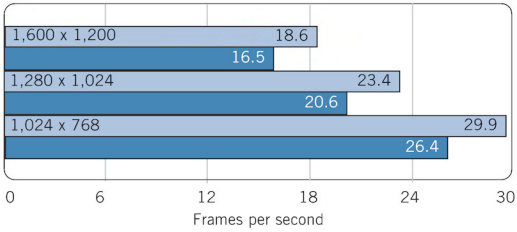
Six different video cards fall under the GeForce4 moniker, so choosing which one to purchase is about as simple as disproving Einstein's Theory of Relativity. To put it simply, the Ti4400 chipset in use on this video card is the second fastest in the GeForce4 range, falling just behind the top end Ti4600. Now that we've got that cleared up, let's see what a video card based on the Ti4400 chipset is capable of. The Ti4400 is just about identical to the Ti4600, with one minor exception: both the memory and GPU clock speeds are slower than those found on the Ti4600. Where the Ti4600 has a memory speed of 650MHz, the Ti4400 clocks in at 550MHz. Likewise with the GPU, which falls in speed from 300MHz on the Ti4600 to 275MHz on the Ti4400. The use of lower quality DDR-RAM is possible (this card comes with 128MB of DDR-RAM) as the memory is clocked at a slower speed, which naturally also helps drop the price of this product from that of the $1000+ Ti4600. Due to the new BGA packaging of this memory (which results in lower temperatures), RAM heatsinks are not necessary. The heatsink on the GPU pushes air over the RAM modules anyway, helping to keep the RAM nice and chilly.

The beauty of the Ti4400 chipset is that it retails at around 30% cheaper than the Ti4600 model, yet can be overclocked to the same speed as the Ti4600. We managed to squeeze 640MHz out of the memory on this video card – a meagre 10MHz slower than the Ti4600. The GPU easily reached the same speed of the Ti4600, at 300MHz, without a sign of image corruption or instability. At the overclocked speeds, the Ti4400 tested almost identically to the Ti4600, with the tiny performance drop being unnoticeable in a real world situation. As a result, savvy buyers would do well to pick up this card over the Ti4600, although those who think overclocking means standing above an alarm clock will probably still pay $400 more for the Ti4600. Even at its default speeds this video card is no slouch. We used our standard video card benchmarks, 3DMark2001 SE, Serious Sam SE and the new CodeCreatures benchmark, to see what this little ripper was capable of, and we were certainly not disappointed by the results.

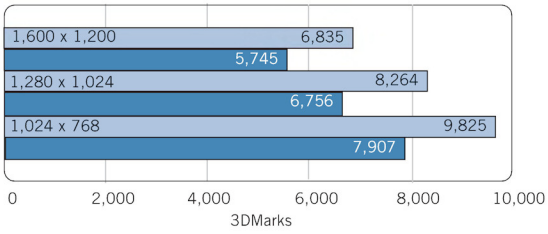
Just like the Leadtek Ti4600-based GeForce4 opposite this review, the MSI GF4Ti4400 seriously smashed the opposition in the extremely demanding CodeCreatures benchmark, posting a result of 26.4 frames per second at 1024 x 768, which is a mere 13% slower than its big brother. Unfortunately the results from the Atomic Q3A demo and 3DMark2001 SE weren't quite as impressive, showing an incremental speed increase over the previous generation of GeForce cards. MSI has a great reputation for adding value to components via the inclusion of tasty extras, and this card is no exception: full versions of No One Lives Forever, Aquanox, Sacrifice and MSI's DVD software prove that padding doesn't always have to be craptastic.

This is the GeForce4 to own if you want the fastest DirectX8 video card available and don't want to fork out the exorbitant amount that the Ti4600 is retailing for. MSI has managed to ship a blazingly fast video card with more than a few goodies, at a price that won't send your wallet skulking in fear.

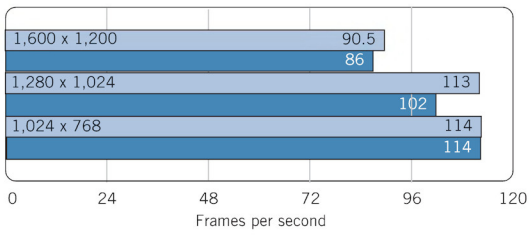
CodeCreatures Benchmark



3DMark2001 SE



Q3Q Atomic Demo



SPECIFICATIONS

128MB DDR-RAM @ 275MHz (effectively 550MHz), NV25 core @ 275MHz, nView support.

Website: MSI Computer www.msicomputer.com.au
Supplier: MSI Computer www.msicomputer.com.au
Phone: MSI Computer (02) 9748 0070 **Price:** $729

9/10

MSI Hermes

One of the biggest concerns these days when designing PCs for corporate environments is size. Apparently the suits don't want the beautiful big boxes that we all know and love. Sure, they can have small PCs, but do they have any idea how hard it is jamming in all those extra fans, lights, fish tanks and other assorted essentials? Highly doubtful. Small PCs aren't necessarily useless: they can be dragged into other areas for frivolous tasks such as serving DVDs, video and MP3s.

MSI's new Hermes barebones system is designed to deliver as much power as possible into a small case aimed straight at the corporate market. A lot of previous barebones systems have been designed to use Pentium III or VIA C3 processors because of the lower heat output when compared to the Athlon and Pentium 4 processors. But thanks to a nifty cooling solution, MSI has packed the Hermes with a motherboard that uses SiS' Pentium 4 DDR333 chipset, the 650. It also includes integrated SiS315 graphics, which is a superior solution when compared to the various S3 Savage graphics implementations found in VIA motherboards. Cooling is achieved using a combination of chunky copper heatsink, ducting and multiple fans. Air is pushed onto the heatsink using a tiny 7000RPM fan, and then this air is ducted a short distance and vented out the side of the case using two lower RPM fans. In order to reduce the howl, both the cooler and case fans are throttled by the motherboard, ensuring they only spin as fast as necessary.

Performance-wise Hermes delivers what we usually expect from the SiS 645 family of P4 chipsets. Of course, it depends upon the specific components you choose to put into the system, but expect performance at a level competitive with all the other P4 DDR solutions on the market.

The rear of the system is bristling with expansion connections, including TV-Out and integrated audio as well as the plethora of plugs usually expected from an integrated motherboard solution. Hermes is definitely funky, and whilst not in the same league of sex-appeal that characterises Shuttle's Aluminium SV-24 unit, it delivers performance that blows PIII based systems away, and stays cool and quiet while doing it.

SPECIFICATIONS

SiS 650 chipset, Integrated SiS315 graphics; one 3.5in drive bay; slimline floppy bay; one 5.25in CDROM bay

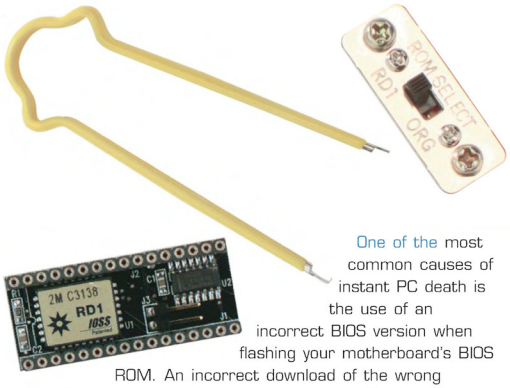
Web site: MSI www.msicomputer.com.au

Supplier: MSI www.msicomputer.com.au

Phone: MSI (02) 9748 0070 **Price:** TBA

8/10

RD1 BIOS Saviour



One of the most common causes of instant PC death is the use of an incorrect BIOS version when flashing your motherboard's BIOS ROM. An incorrect download of the wrong cryptically named file, and hey presto, your motherboard is a Frisbee. Power strikes, while rare, have also been known to send a BIOS update haywire. If you're lucky you might be able to reboot your PC and upload the correct version, or maybe hot swap the BIOS ROM with one that's working, but more often than not it's off to motherboard heaven for your PC's backbone. This is why companies such as Gigabyte now incorporate a backup BIOS ROM on the motherboard, to be used if the primary ROM cops a beating. The RD1 offers the same method of protection, a backup BIOS ROM, for motherboards.

To install the humbly named BIOS Saviour, your BIOS ROM must be mounted in a removable socket and not soldered to the motherboard. This excludes a huge number of potential motherboards that would benefit from the RD1. Three different versions of the BIOS Saviour are available to cater for the different types of IC used in BIOS ROMs — you'll need to check that the RD1 will fit the socket in use on your motherboard.

When you're ready to install, first pull out your existing BIOS ROM from the motherboard with the included IC extraction tool, then plug the BIOS Saviour into the now empty BIOS ROM socket on the motherboard before piggybacking the old ROM chip onto the back of the RD1. Plug the ROM selector switch into the Saviour and you're now able to select which BIOS ROM is used when booting up your PC at the flick of a switch.

This device can be a reassuring backup if you like to experiment with different BIOS versions, but unfortunately it's not going to be compatible with a huge range of motherboards, as most have their BIOS chips soldered onboard. And at $50, it's cheaper to make sure your next motherboard already has this type of protection built in.

SPECIFICATIONS

3 types: DIPP ROM, PCC ROM for Intel 8x chipset and PLCC type ROM.

Web site: VICS Technology www.vicstech.com

Supplier: PC Range www.pcrange.biz

Phone: PC Range (08) 8322 9378 **Price:** $44- $50

7/10

Just Cooler PS4 300

Building a better power supply is a bit like the clichéd reinvention of the mousetrap. After all, apart from pumping out more power, what can possibly be improved upon? Over the past months we have seen dual fan models, designer Aluminium casings and a plethora of colour schemes all vying for your attention — and money.

Just Cooler is the latest company to try something different in the PSU game, in the form of the PS4 300. Its take is perhaps the most innovative we have seen, taking the normally vertically mounted exhaust fan and mounting it horizontally, using the same principles as the horde of bay and expansion slot mounted system coolers that Just Cooler is known for.

By mounting the fan this way there are several advantages: the biggest is that the fan does not have to be deafening in order to shift decent volumes of air. This is because the horizontal dimensions of the PSU are greater than the vertical ones and thus allowing a larger cooling fan to be mounted. As we all know, the larger a fan gets, the slower the blades need to spin to move the same volume of air.

The other noticeable advantage is that by freeing up the space taken by a vertically mounted fan on the back of the PSU, there is room for the return of the IEC pass-through power socket. Rather than settle for one IEC, Just Cooler has looked at all the newly freed up real estate and smacked four of the suckers in there — more than enough power for most people's needs. The main problem is that few modern peripherals, apart from monitors, actually use the 'kettle cords' that these plugs are designed for.

The other major problem with the PS4 300 is that it suffers from short-cord syndrome, a problem that sometimes plagues power supplies and can only be cured by stretching the cords to its limits, and swearing a lot. The ATX, ATX12V and Auxiliary cord are only 37 cm (compared to 45 cm on our reference Topower PSUs), while the Molex cords are 60 cm long.

This means that the determining factor in choosing the PS4 300 will be whether or not it will fit into your system, so it's worthwhile spending some time with a ruler first. Just Cooler should be commended for coming up with a different PSU design, however the short power cords might just cripple it.

SPECIFICATIONS

300Watt Pentium 4 compatible PSU; four IEC plugs; five Molex plugs; quiet horizontally mounted fan.

Web site: Just Cooler www.justcooler.com.tw
Supplier: Anyware www.anyware.com.au
Phone: Anyware (02) 9879 5788 **Price:** $99

7.5/10

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Instructional manual

Home Kit includes:
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Blank plate
Audio connection cable
USB connection cable
Instructional manual

Specifications Dimension (w x d x h) 122 x 230 x 43 mm • Weight 1100g (without HDD) • Memory media 3.5 inche IDE hard drive (not included) • frame build in NEO35 PC • cooling 40 x 40 x 10mm turbo fan • SNR 100 db • D/A converter 18 bit • THD better that 0.01% • frequency response 20Hz-20kHz • operation system WIN98/2000,MAC OS.

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www.kazelectronics.com.au or Phone: 02 6259 8699

Cyberbank PC-EPhone

Connected PDAs don't get much cooler than this, according to Bennett Ring.

Geek toys – you've got to love them. They usually cost an arm and a leg, look ultra cool and hi-tech, yet at the end of the day don't usually do a whole lot. The PC-EPhone fits snugly into this description, with one small exception: while other geek toys are happy just to look nice while gathering dust, this is one gadget that you'll find hard to put down.

The PC-EPhone is the latest example of a device that merges the functions of a PDA and mobile phone into one. As the mobile voice market reaches saturation point, the development of mobile data devices is seen as the Next Big Thing, hence the glut of combo PDA/phone devices due for release.

By combining these two devices, the PDA reaps the benefits of being connected to the Internet, allowing it to function as much more than a simple personal organiser. Some of these additional features include full Web browsing, email and remote access capabilities (in the case of the PC-EPhone via Citrix Metaframe support). The phone component of this device is CDMA compatible, capable of transferring data at a maximum speed of 14.4Kb/s.

However, according to the supplier, as Telstra upgrades its CDMA network over the next few months, this should increase to 144Kb/s by the end of the year at the latest. To put it into perspective, that's faster than an ISDN connection in a device you can take anyplace there is CDMA coverage.

The PC-EPhone isn't the first PDA type device to allow you to get your online fix, but it's easily the best for Web browsing. The reason for this is simple: it uses an all-singing, all-dancing 640 x 480, 256 colour, 200dpi backlit TFT LCD. Every other PDA screen has a much lower resolution, which means Web pages must be specially formatted to fit onto the smaller screen. This often makes the Web pages very confusing to navigate, as they are presented in a manner different to the creator's intentions.

But on the PC-EPhone, Web pages are presented exactly as they were created, as the screen is large enough to fit a full Web page, with only a minor amount of scrolling necessary. The screen is an absolute joy to behold, and is one of the main attractions of this device.

Unfortunately the price of having such a large screen is an increase in the overall size of the unit. At 102mm x 127mm x 22mm, and weighing 300 grams, it isn't the sort of PDA you can stuff into your pocket and forget about. While everyone at the Atomic office was very impressed with this device, the number one complaint was the larger size when compared to other PDAs. This isn't going to be something that everyone has a problem with, so if this device appeals to you you'd be wise to go and have a look at the unit in a shop to see if the size deters you.

The PC-EPhone uses an embedded Windows CE operating system, and ships with the Bsquare spreadsheet application, Internet Explorer, Pocket Word, Mpmail email client, as well as a full range of calendar, contact and memo applications. Thanks to the built in phone, extensive SMS capability is also included, which treats SMS messages in a manner very similar to emails. This makes it much simpler to organise your huge number of SMS messages, if you happen to be an SMS fiend that is.

A huge range of applications and addons can be fitted via the CompactFlash II card slot, including GPS, a 1GB IBM Microdrive and an adaptor to hook the PC-EPhone up to a projector. To input text into any of these applications a small touchpad is positioned at the bottom of the screen, but most people will find the powerful handwriting recognition feature to be a much faster method of inputting text.

A serial cable is provided to synchronise with your desktop PC, which can be replaced with a USB cable at an additional cost. The cradle used for synchronisation is also used to charge the unit and one extra battery at the same time. Each battery will last between 2-4 hours with the backlight on, or five days when in standby mode. 32MB of RAM and 32MB of Flash ROM provides plenty of room to store wads of data, while the StrongARM SA-1110 processor ensures every action is performed swiftly.

If it isn't obvious to you yet, the PC-EPhone is the ultimate in geek gadgets, as witnessed by the number of jaws that dropped when it did a tour of the Atomic office. It's also a must-have item for people who need to stay connected when they're out and about. It's a bit clunkier than what many people are used to in a PDA, and isn't the cheapest connected PDA around, but these shortfalls don't stop it from being a brilliant device, which shows clearly the way mobile data devices are headed. The days of having Internet access with you, wherever you may be, are just around the corner.

SPECIFICATIONS

Windows CE 3.0 OS; CDMA; 32MB RAM; 32MB Flash ROM; and 2 x Lithium Ion battery.

Web site: Cyberbank www.cyberbank.co.jp

Supplier: Ingram Micro www.ingrammicro.com.au

Phone: Ingram Micro (02) 9741 2028 **Price:** $2,299

9/10

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AOpen GeForce3 Ti200 with 128MB RAM

Just like Bennett Ring, this video card has double the memory of its competitors.

When 64MB versions of the GeForce2 arrived on the graphics card scene around two years ago, there weren't any games that could make use of the extra memory. Hence we didn't see the need for people to fork out extra cash for these cards over the 32MB version. Fast forward to today, and we've just got our hands on our first 128MB GeForce3 card and we ask ourselves: is there a need for such a large amount of memory, considering that 64MB has only recently become the norm?

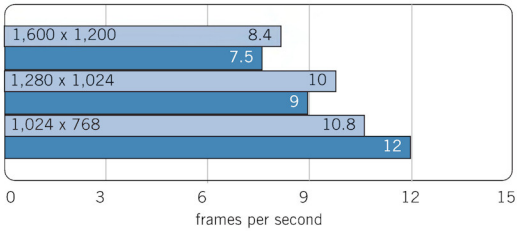
Other than this increase in memory size, the AOpen video card is a stock standard Ti200. It's surprising to see that this larger amount of memory has been added to the Ti200 chipset and not the higher end Ti500. A likely reason for this is a worldwide shortage of the Ti500 chipset, a situation that has had most video card manufacturers throwing a royal dummy spit. You might be wondering how doubling of the onboard memory can help a video card perform faster? In a nutshell, by having more room to store data within the speedy onboard memory – with textures being a prime example – the video card doesn't need to access your system memory via the slower AGP port as often. While this sounds all well and good, games need to make use of this extra memory for it to be of any use. Unfortunately, most current games don't.

To prove this, we fired up four different benchmarks: the Quake 3: Arena Atomic Demo, the Serious Sam SE Co-op demo, 3DMark2001 SE, and finally, the CodeCreatures benchmark. Of these, only the CodeCreatures benchmark demands large amounts of system memory – it requests 512MB to run well. We also benchmarked an ABIT GeForce3 Ti200 with 64MB of memory for the sake of comparison, and all testing was performed on the standard Atomic Athlon testbench.

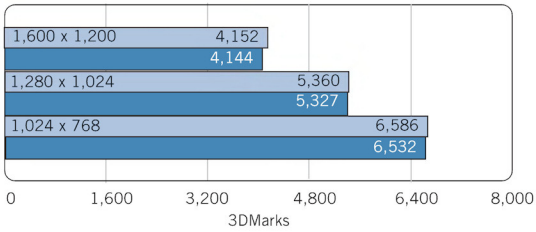
With the exception of the CodeCreatures benchmark, both cards recorded almost identical benchmark scores, with the differences between the two well within the acceptable variance of each test. So far it seems that the extra onboard DRAM makes no difference for most current generation games – and then we load CodeCreatures, one of the most taxing video card benchmarks currently available. The benchmark results show just how demanding CodeCreatures can be: the 128MB Aopen card reached 12fps at 1024 x 768 resolution, while the 64MB ABIT card reached a slightly slower 10.8fps. A 1.2fps increase might not sound like much, but it's actually an 11% increase in speed. At the highest resolution of 1600 x 1200 this increased to a 12% lead, showing that the extra memory does have a tangible benefit in applications that demand it.

Thanks to the low cost of DRAM modules at the moment, the 128MB version doesn't cost a great deal more than the 64MB Ti200 cards. As more games using higher resolution textures are released, the difference between the 128MB and the 64MB cards is only going to become more pronounced. If there is a limitation with this card, and it's a biggie, it's that it is based on the GeForce3 chipset, which will soon be shuffled into The Land Of Obsolete thanks to the GeForce4.

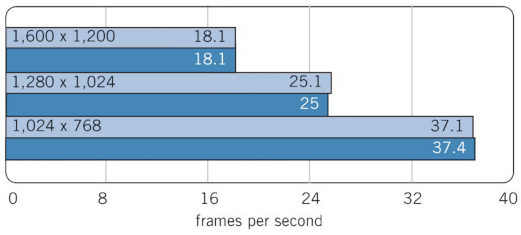
CodeCreatures Benchmark



3DMark2001 SE



Serious Sam SE Co-op Demo MAX



AOpen GeForce3 Ti200 w/128MB
ABit GeForce3 Ti200 w/64MB

SPECIFICATIONS

128MB DDR-RAM; GeForce3 Ti200 chipset; programmable vertex and pixel shaders.

Website: AOpen www.aopen.com
Supplier: Servex www.servex.com.au
Phone: Servex (02) 8745 8400 **Price:** $499

7.5/10

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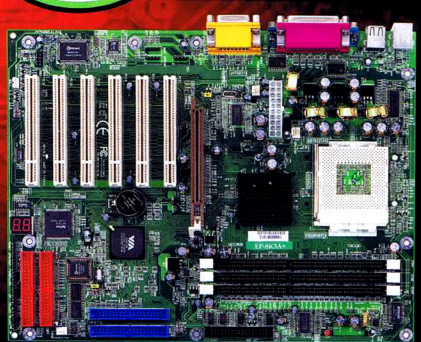

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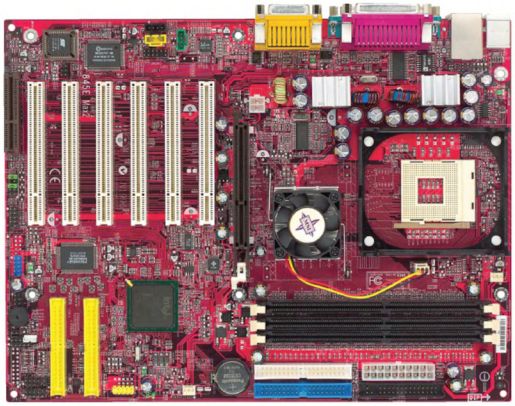
It's fast times at Northwood high, or so John Gillooly thinks...



The Pentium 4 has taken several evolutionary steps over the past months: first there was the introduction of the Northwood core which took the Pentium 4 to a 0.13micron process and upped the L2 cache to 512KB; and following on from this, the 400MHz FSB was increased to 533MHz.

The jump to a 533MHz FSB takes the Pentium 4 further ahead of the Athlon XP in the performance stakes, and if it wasn't for the locked multiplier and high cost then the Pentium 4 would currently be the performance user's CPU of choice.

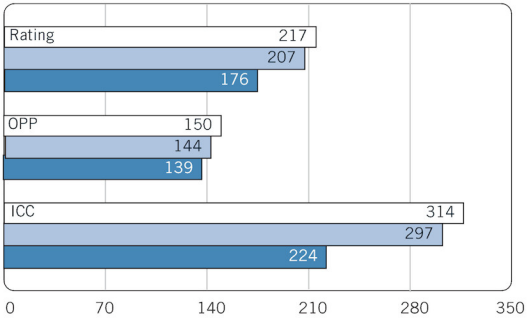
Unlike the cache increase, the jump in FSB necessitates a chipset update, and Intel has delivered this in the form of the i845E. There is also another new chipset in the form of the i845G, which supports the increased FSB and includes Intel's new 'Extreme' integrated graphics solution.

Over the next few months we can expect to see more and more 533MHz FSB supporting chipsets appearing from SiS and VIA. But for now, Intel is the first in the market. MSI has used the i845E in its 845E Max2-BLR motherboard, and has taken the opportunity to add onboard support for Bluetooth connections. This advance comes at just the right time, as both Microsoft and Logitech are due to release wireless mouses based upon Bluetooth technology, taking it much more mainstream than the gadget wielding roadwarrior niche that it has been aimed at. One of the other big developments is that MSI has packaged networking software and a secondary USB Bluetooth connector so you can network MSI 845E Max2-BLR with another PC purely via Bluetooth.

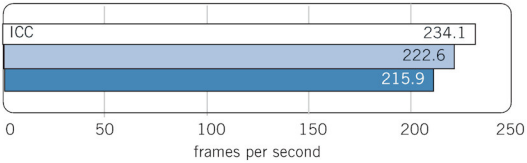
Setting up a Bluetooth connection is a notoriously infuriating and difficult task, so it's a pleasant surprise that the software included with this board is so user friendly. The networking component at least is intuitive and it is a quick task to establish the necessary connections.

We tested the performance of the MSI 845E Max2-BLR with a 533MHz FSB 2.4GHz Northwood Pentium 4 and a 400MHZ FSB 2.4GHz Northwood Pentium 4, both using 256MB PC2100 DDR RAM. This was compared to AMD's latest offering: the Athlon XP 2100+ running in our A7V266-E testbench using the same 256MB of PC2100 DDR RAM. We tested using SYSmark2002 and Quake 3: Arena using CPU settings.

SYSmark2002



Quake 3: Arena CPU settings



MSI 845E Max2-BLR with 533MHz FSB 2.4GHz P4
MSI 845E Max2-BLR with 400MHz FSB 2.4GHz P4
ASUS A7V266-E with Athlon XP 2100+

In both tests the performance difference between the 400MHz and the 533MHz FSB was in the order of 5%, which is a small but noticeable performance difference for two CPUs running at the same frequency. The difference between the Athlon XP 2100+ and the 533MHz FSB Northwood is 23% in SYSmark2002, which is partially a function of speed and partially a function of SSE2 optimised code in SYSmark2002. In Quake 3: Arena the difference was around 8%, which is starting to telegraph the Pentium 4 pulling away from the once highly competitive lower clocked Athlon processors.

MSI has delivered a fast, feature-packed motherboard in the form of the i845E Max2-BLR. The inclusion of an easy to use Bluetooth option is refreshing and very welcome. It is just unfortunate that getting your hands on a 533MHz FSB Pentium 4 will probably necessitate offering your DNA sequence for sale on eBay.

SPECIFICATIONS

Intel 845E chipset; supports 400MHz and 533MHz FSB P4s; Bluetooth networking kit included.

Web site: MSI www.msicomputer.com.au
Supplier: MSI www.msicomputer.com.au
Phone: MSI (02) 9748 0070 **Price:** TBA

8.5/10

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http://www.checksun.com.au

JNC SSF-264 MP3 player

We hadn't heard of JNC before stumbling upon its small stand at the recent Comdex IT show in Sydney, which is kind of strange considering the brilliance of this MP3 player. According to its Australian distributor, JNC ships approximately 15,000 MP3 players each month, mainly to the South East Asian region, so it's obviously not a small time player when it comes to these devices.

This MP3 player weighs only 30 grams without a battery — the same as a Milky Way — but it's much tastier than any kids' chocolate bar could ever be. The low weight is due to an all-plastic construction, yet the simplicity of the styling means there's not much chance of anything snapping off. Speaking of the styling, this is a very attractive player: it measures a meagre 90mm by 30mm, and due to the headphone cables being buried within the neck cord, the only way to wear it is around your neck. If you purchase your own headphones you could always hide it in your pocket. But due to the, erm, phallic shape of this device, that might not be such a great idea, if you know what we mean.

So it looks great, but how does it sound? Thankfully for JNC: excellent. It's not quite up there with the Intel Pocket Concert we checked out so many months ago, but then again, nothing we've heard since has been. But when compared to the majority of MP3 players on the market, this player easily reaches the upper echelons of audio quality.

The downloading software is everything that Sony's Network Walkman software should have been: simply point it to the songs you want to download, and away you go. To prevent unlawful copying of songs, you can't upload MP3s from the player to a PC that the songs didn't originate from, something that is becoming commonplace in new MP3 players. While this device only uses a single AAA battery, the maker claims this is enough to power the player for a very impressive 20 hours. Sadly, unlike some of the players we've checked out recently, the unit doesn't come with a recharger and battery.

This might be the first time you've heard of JNC, but judging by the quality of this little bullet of joy, it certainly won't be the last. When you consider that it's one of the cheapest and nicest sounding mp3 players, you'll be hard pressed to find reasons not to make this your next mp3 player.

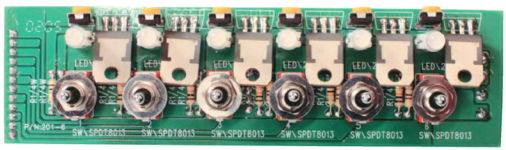
SPECIFICATIONS

USB interface; 30 grams; requires 1 x AAA battery; graphic EQ with presets.

Web site: JNC www.jnc-digital.com.au
Supplier: JNC www.jnc-digital.com.au
Phone: Datum Tech Pty Ltd (02) 9264 8677 **Price:** $419

9/10

Bay Bus Kit



Case fans. Bane of the light sleeper, saviour of the overclocked CPU. While the newer Palomino Athlon and Northwood Pentium 4 CPUs, which happen to run a heck of a lot cooler than the Athlon Thunderbird and the Pentium III, don't have to worry much about case temperatures, their steamy predecessors can benefit greatly from a cool case. This applies even more so if they've been pushed beyond their rated limits. There's got to be a trade-off for having a well ventilated case, and it arrives in the form of noise pollution.

However, there is a way to control your case fans so they only do their thing when necessary, which is usually around the same time you've got your speakers cranked to gibtastic levels. It's called a fan bus, and the Bay Bus kit from PC Case Gear is a prime example.

Unlike the slightly more exotic Rheobus kit (if you could ever call a fan bus exotic), the Bay Bus doesn't allow you to adjust the speed of your fans from 0% up to 100% of their potential speed. Instead it's much simpler, with an on, off or one pre-set speed setting for each fan.

As a result it's cheaper: $50 compared to $75, and because it has toggle switches for each fan instead of fan speed knobs like those on the Rheobus, it looks like a much simpler device. Probably because it is.

In fact, if you have any D.I.Y. electronics knowledge at all, building one of these things in a couple of hours isn't too hard, and will probably end up costing you less than twenty big ones. But the Bay Bus kit is designed for those who want the end result without having to do any hard work, making it perfect for those with the electrical know how of Scooby Doo.

Due to the simple nature of this device, it would be pretty hard for the manufacturer to stuff it up. So it's no surprise to see that this fan bus works exactly as advertised, taking a matter of minutes to install.

A well thought out template will make drilling the holes in a spare drive bay cover a cinch even for those who aren't intimate with power tools. Which we hope is most of you. If you can't be bothered making one of your own and happen to have a half dozen fans on your case that need taming, you'll find that this device is $50 well spent. If not for the sanity of yourself, for the sanity of anyone else you live with.

SPECIFICATIONS

6 x fan speed switches, user set speed between 5V-12V, drilling template for bay cover.

Web site: PC Case Gear www.pccasegear.com
Supplier: PC Case Gear www.pccasegear.com
Phone: PC Case Gear (03) 9572 3444 **Price:** $50

8/10

X-MeM

Last month we checked out the Anypak mobile hard drive, and made the comment that it was the first hard drive we'd seen that could be called sexy. We must have started something with that comment, because this month heralds the arrival of the X-MeM HDD PAK, a device that takes sex appeal in hard drives to a whole other level.

To use it you're going to need a 2.5in form factor (laptop) hard drive. This is then inserted into the HD enclosure, which is a quick and easy job. Once you've installed your 20GB, 30GB, 40GB or 60GB drive into the enclosure you'll then need to install the drivers onto your PC, unless you're running XP or W2K, in which case detection of the unit is automatic.

If you've got a FireWire port on your PC you can plug the X-MeM into it to achieve a maximum data throughput of 20MB/sec. For those not blessed with a FireWire port, a USB adaptor is included, although this lowers the maximum theoretical throughput to 850KB/sec, which will make the transferral of large files a snooze inducing process. Once you've set it up, you can hot swap drives as if they're nothing more than pieces of bread in your toaster.

The beauty of this device is literally the beauty of this device. It's quite simply stunning in its design, which might have something to do with the fact it's also compatible with the Mac. As we all know, to be used by a Mac user a product has to look pretty regardless of whether or not it does the job, so this thing will fit in well with the rest of their super stylish Mac setup.

Something this gorgeous is going to end up costing you lots in the cash flow department. And at $95 for the HD enclosure and $295 for the base, cheap this device is not. In fact, if this product weren't so damn nice to look at, we'd be inclined to say the overall price of $390 is a rip off.

But we'd have to stop drooling all over it before ever coming to that sort of conclusion.

SPECIFICATIONS

USB or FireWire compatible, MAC or PC compatible, requires 2.5" HD.

Web site: Sieger Design www.sieger-design.com
Supplier: Anyware www.anyware.com.au
Phone: Anyware (03) 9763 8200 **Price:** $390

7/10

mStation Car Jukebox

This unit comes fitted with a 40GB IDE Seagate hard drive. You can purchase the unit sans hard drive, however, and put any sucker you like in there. In theory, 40GB allows you to store up to 12,000 MP3s, depending on the bit rate the files were encoded at. As the mStation supports bit-rates all the way up to 320Kb/s, you are limited only by storage capacity.

The mStation comes with two docking units: one for your PC, with an IDE and molex power connection which allows you to neatly slide the unit into a 5 1/4 " bay in you PC case; and the other unit is for you car, with wired power/ground connections, a 'barrel' 12V connection, RCA-outs and a headphone jack. You can either swap out your existing car stereo, or mount the mStation under a seat or in the boot, and use the supplied wired, backlit remote control. For head units without RCA inputs, an FM modulator is provided. As hard drives are generally susceptible to knocks and bumps, there are some supplied rubber mounts to minimise the chance of damage in this way.

The black handle on the front allows its removal from your car's dashboard or PC, and can be locked in place with a small key reminiscent of the keyboard locks found on old PCs. A faceplate is provided to use as a dust cover when the unit has been removed from your PC. Also supplied is an infrared remote control. For those who can't help but modify things, we found that by plugging a standard set of speakers into the RCA-outs, and with a simple bit of modding to the power connector, the unit could be used as an MP3 jukebox for your PC. Just don't mess up the ground and 12v connections. When docked with your PC the hard drive just acts as another IDE device. As the decoding and playback takes place via an onboard chip, no special software is required. Nice one.

The mStation can read m3u playlists. This allows you to use Winamp, or Real Jukebox (bundled) to build different playlists for your particular listening tastes.

The 56 x 32mm LCD display is clear and fairly simple to navigate. As the mStation supports ID3 tags, it will display the artist's name and song title of each track as it plays. If the tag is not there, it will still display the file name.

This is a slick unit.. Available in Black, black and dark black it looks real sweet in your dashboard.

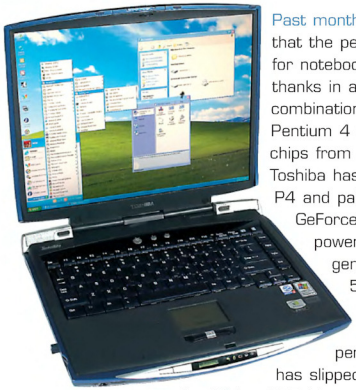
SPECIFICATIONS

Response: 20Hz - 20kHz, D/A Converter: 18 bit, Output impedance: 1kOhm, THD+N: 0.1%, IMD: 0.06%.

Web site: Kaz Electronics www.kazelectronics.com.au
Supplier: Kaz Electronics www.kazelectronics.com.au
Phone: (02) 6260 2666 **Price:** $990 w/40GB HD, $800 w/out

8.5/10

Toshiba Satellite 5100



Past months have shown us that the performance bubble for notebooks has burst, thanks in a large part to the combination of Intel's Mobile Pentium 4 and new graphics chips from ATI and NVIDIA. Toshiba has taken a 1.7GHz P4 and paired it with NVIDIA's GeForce4 440 Go chip to power the latest generation Satellite 5100 notebook.

Does it fruckin' rock? Ohhh yes: it performs like someone has slipped a proton pill into its drink – AND it's a work of art.

Toshiba has managed to cram as many features as possible into the rigid plastic casing to deliver a masterpiece of gadgetry positioned as the solution to the modern geek's multimedia needs. At last we have a notebook worth playing games on. Rather than tiny tinny speakers, it uses a system designed by harmon/kardon, coupling some decent stereo speakers with an inbuilt subwoofer. They still don't manage to sound as clear as good desktop speakers, but the quality is definitely a cut above the normally poor sound associated with notebooks. If this isn't good enough, then the SPDIF output can be used to output to 5.1 speakers, and with TV-Out support from the GeForce4 Go, you can get the most out of the combined DVD/CDRW drive. Of course, the 5100 is equally perfect for watching DVDs on the move, as well as keeping your CD collection up to date, and the built in SD card reader will help those with SD based MP3 players or digital cameras.

In a departure from the G-spot control stick used in previous Toshiba notebooks, the 5100 uses a touch pad for mouse pointer control which actually doubles as a small monochrome touch screen, called a cPAD. The touch screen can be customised using the provided software to both control Windows programs and run stand-alone apps such as calculators.

Yuppies are likely to buy the Satellite 5100 because it has been modelled on the Audi TT roadster – but the gadget and gaming obsessed will want it because they know that under the hood, it packs an amazing arsenal of features that will outgun any other notebook on the block.

SPECIFICATIONS

1.7GHz P4-M processor; 256MB DDR RAM; 32MB GeForce4 Go 440; 40GB HDD; 15in UXGA TFT.

Website: Toshiba www.isd.toshiba.com.au
Supplier: Toshiba www.isd.toshiba.com.au
Phone: Toshiba 1800 021 100 **Price:** $7,299

9.5/10

ThermalTake Volcano 7+

If you think the name of this HSF hints that it's merely a refined Volcano 7, think again. The Volcano 7 wasn't rated too well in Issue 15 of Atomic due to the woeful placement of a temperature probe that had the duty of controlling the speed of the fan, so it's reassuring to see that the Volcano 7+ has little in common with the Volcano 7.

The inclusion of two mounting bracket types means you can use this HSF on either an AMD Socket 370 or an Intel Socket 478 CPU. The all copper heatsink has a very smooth finish, making lapping of the bottom unnecessary, and uses what Thermaltake calls 'Tiny Fin Technology' to cram 36 fins onto the heatsink. A 70mm fan is mounted via the use of a duct, which gives this HSF a very distinctive appearance.

Another distinctive touch is the use of a 3-speed fan RPM selector, allowing you to run the fan at 3000, 4800 or 6000RPM. At its highest speed the fan pushes 49 CFM, but it must be said that at this speed it's the loudest fan we've heard on an HSF, including the infamous FOP-38 that we benchmarked it against – which is a bit of a bummer, because at the highest speed this HSF kicks some serious CPU cooling booty.

Our Athlon XP 1800+ reached a maximum temperature of 42°C under load, which compares very well to the 46°C that the FOP-38 reached. Its idle performance wasn't quite as impressive, coming in at only 2°C cooler than the FOP-38 at 39°C.

However, when we slowed the fan to a slightly less insanity-inducing speed of 5000RPM, the performance dropped markedly. Load temperature increased to 47°C, 1°C hotter than the much cheaper FOP-38, while the idle temp increased to 41°C, identical to that of the FOP.

If you desire the ultimate in air-cooled heatsinks due to an overclocked beast of a CPU, and always wear headphones while using your PC, this is the HSF your overheating CPU is begging for. Unfortunately, the majority of gamers don't use headphones (especially those with swanky surround sound setups), and at the quieter fan speeds this HSF is sadly no better than those selling at half its price.

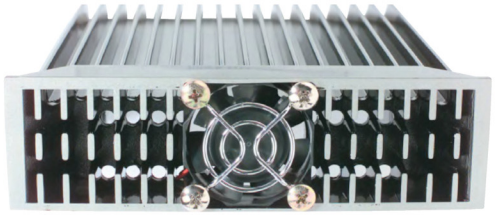
SPECIFICATIONS

49 CFM at maximum speed, copper heatsink, 630 grams, 3 speed fan speed selector.

Website: Thermaltake www.thermaltake.com
Supplier: Anyware www.anyware.com.au
Phone: Anyware (02) 9879 5788 **Price:** $66

7.5/10

ACE 135



When it comes to churning out additional heat, hard drives are one of the leading contenders for increasing the temperature of the interior of your box. You've now got heatsinks on everything from the Northbridge to the system RAM, so why not whack one onto your toasty brick of a hard drive? That's exactly what the ACE 135 is – a giant HSF for your hard drive.

Constructed entirely from Aluminium, this product looks just like a huge heatsink. When mounted, it covers the top of your HD and also wraps around both sides, which is exactly where most of the heat in a hard drive gathers. It's a rather large device, taking up a full 5.25" drive bay for every 3.5" hard drive used, but due to the Aluminium construction weighs in at only 500 grams.

Installation proved to be hassle free: simply screw your HD into the ACE 135, and then mount it into an empty 5.25" drive bay as if it were a CD-ROM or DVD-ROM. A molex connector provides juice for the tiny front mounted fan, which is so quiet it's unnoticeable. Thankfully every screw hole matched up perfectly with those on the HD case, which is more than we can say about some of the cheaper PC case HD bays.

We've got to admit that initially we were sceptical as to whether or not this device would actually do anything, so to test the unit we installed a Quantum Fireball Plus AS 7,200RPM IDE drive. Around 700MB of files were copied to the drive before it was defragged, and the temperature was measured five minutes into the defrag both with and without the ACE 135 in place. Ambient room temperature was a constant 20°C throughout the testing. Without the ACE 135 mounted, the HD reached a maximum temperature of 32°C, and to our amazement, this dropped to a much lower 24°C when the drive was placed inside the ACE 135. For those with a penchant for percentages, that's a 33% decrease. While IDE drives probably won't need one of these coolers to operate at a safer temperature, we're sure a SCSI drive's stability and lifetime would benefit from this device.

SPECIFICATIONS

Aluminium 5.25" drive bay Hard Drive cooler. 1 x front mounted fan.

Website: Sky Hawk Group www.skyhawkgroup.com
Supplier: Sky Hawk Group www.skyhawkgroup.com
Phone: (02) 9790 6647 **Price:** $33

7.5/10

RD2 PC Geiger

The art of case modding bears many similarities to that of hot-rodding. Most souped up cars have a bank of dials and gauges to give the driver an idea of what's going on inside their V14, twin turbocharged, nitrous-injected behemoth of an engine, so it's only natural to assume that the PC case modding scene is going to have an equivalent device. Enter the RD2 PC Geiger.

When installed, this device displays various pieces of information about the state of your PC's internals: you can choose to display the speed of your front side bus; or perhaps you'd rather see a percentage value indicating the load on your PCI bus. You can even see the amount of data being shunted over your PCI bus in KB/sec or MB/sec. The full range of POST messages can be displayed on the PC Geiger, which could prove to be invaluable when troubleshooting a machine that won't boot properly. Thanks to a couple of switches on the front, clearing your CMOS becomes a breeze, without any need to open your case and dig through wads of cabling to reach a tiny jumper. Want to change which of your hard drives is the master and which is the slave? Again, the simple flick of a switch on the front panel of the RD2 enables you to control this without having to pry through the guts of your beast.

Two USB ports and a Firewire port are also provided to allow easy access for your inputting pleasure. The Aluminium front panel certainly looks the biz, unlike some of the cheaper temperature displays that are available. While the list of things that the RD2 can do is impressive, the ease of installation certainly is not. Thanks to a manual obviously written by someone two weeks into a 'Learn Ingrish in ten super fun happy steps' course, getting everything to work on this device is going to take a lot of trial and error. With six two-pin connectors and two three-pin connectors, none of which are labelled, hooking each connector up to the correct point proves to be an exercise in frustration.

If it weren't for the woeful manual (which is about as easy to read as if it had been printed in Gaelic) and the lack of labels on the different cables, we wouldn't hesitate to recommend this nifty panel. But unless you enjoy problem solving, you'll find the installation of this device as easy to understand as the following line from the manual 'Overclocking is not always make the speed first'. Need we say more?

SPECIFICATIONS

One of four display modes: POST, FSB speed, PCI load, PCI load in MB.

Website: VICS technology www.vicstech.com
Supplier: PC Range www.pcrange.biz
Phone: PC Range (08) 8322 9378 **Price:** $159

7.5/10

Score 47,856
TONY HAWK III
BS DARKSLID
3,196
360 FLIP
QUIKSILVER
TONY HAWK III

GAMES

The difference between Virtual and Real

This month Bennett Ring lives up to his GunSlinger nickname by partaking in a frenzied bout of mass cardboard mutilation. All in the name of research, of course.

The first person shooter is the biggest scapegoat of a genre in the whole gamut of gaming types. From the early days of Doom, it's been labelled as the culprit in a variety of massacres, shootings and high school killing sprees. Not that there has ever been a rigorous scientific study to confirm or deny this, but who needs that sort of evidence when politicians and hacks hunt for a target to lay blame on?

Recent social events for Atomic staff seem to prove that playing a first person shooter and firing a real life weapon are worlds apart.

Looking for something out of the ordinary to do on the weekend, a group of us recently attended a shooting club to partake in a 'Tourist Pistol Experience'. This involved a brief training session followed by the firing of a .22 Ruger Semi Automatic, a .38 Smith & Wesson Police Special, and finally, the .44 Magnum, which left us all quoting Dirty Harry movies for the rest of the day. The majority of people who attended are what you could call First Person Shooter Freaks – we've been playing these types of games ever since being sucked into the world of Wolfenstein 3D.

And, surprise, surprise, those without any prior real world shooting experience sucked hard at pistol shooting.

Due to our l337 Counterstrike skills, we all expected to be taking out headshots at a range of 100 metres while blindfolded, so why did we find it hard to even hit the target at the piddling range of 10 metres? Unless you've fired a real gun you might be asking the same question. Let me tell you now: a mouse and a gun have about as much in common as a tadpole and the Space Shuttle.

You simply can't compare the two. For starters, a mouse requires no strength at all, while a two kilogram revolver held at arm's length soon starts to feel like the gun is constructed entirely of lead. You might think years of FPS experience could develop a keen eye for aiming, until you realise that they both work on totally different principles. Aiming a mouse on screen involves absolutely zero depth perception, as the display you're looking at is two-dimensional. On the other hand, a pistol requires the firer to focus on three different focal planes: one at the rear sight of the pistol, one at the front sight and lastly, one at the target. The net effect of this is that the target usually ends up being a blurry mess as you try to line up the front and rear sight.

Introduce that scary beast known as recoil, and you'll soon hammer into your arms and shoulders the difference between shooting a pre-rendered model of a .44 Magnum with lovely 22KHz sound effects, and actually shooting this brute of a gun. When you shoot something with your mouse, there's a reassuring little click. But when you shoot something with a real gun, it's as if the pistol has turned into a miniature dragon, shooting out a ball of flame and recoiling viciously as if to escape your gun-crazed clutches.

While we don't deny that first person shooters, specifically team based ones, can help develop real world tactics, claiming that first person shooters can help a person learn how to shoot is utterly ridiculous, as proved by our woeful scores from the pistol shooting. If it weren't so, don't you think the Armed Forces would be training all their cadets with a few quick rounds of Global Operations, instead of spending millions on training aids like the W.T.T.S. facility and real world firing ranges? Unfortunately first person shooters are still going to cop a lot of flack until the next big scapegoat comes along – we can only hope the blame goes full circle and crappy punk bands are blamed once again for the decline of society like they used to be in the past.

The Xbox also doesn't make you shoot any better. How's that for a seamless segue? Unfortunately the Xbox hasn't made Microsoft the king of consoles, either. . . yet. Microsoft has recently scaled back its sales predictions for the first six months by around 40%, which shows Xboxes haven't been selling anywhere near as well as Microsoft thought they would.

A week after this was announced, the Xbox man himself Seamus Blackley (he's the reason the Xbox exists) sadly resigned from MS – a turn of events which doesn't exactly impart a lot of faith in the future of the platform. So what has MS done to rectify this shortfall in sales? Something none of us could have predicted to occur so soon after the Xbox launch: slashed the European and Australian prices to the pittance of $400 in our land of dirt. Even though the Xbox is easily the most superior console platform in terms of sheer oomph, I believe that the success of Sony's PS2 has meant many people have already spent more than they're willing to on a gaming console.

If MS had of waited to release the Xbox at around the same time that the PS3 is to be released, a year or two down the track, perhaps it would be a different story. I can only hope that the Xbox does eventually succeed.

For starters, it is indeed a kickarse piece of hardware, at a price too good to pass up. And having another major player in the console market can only be a good thing for gamers, provided MS doesn't end up dominating in the same way it owns your OS world. Regardless, I know for sure where $400 from my next pay is going. . .

Global Operations

Take down drug cartels with speed and ease, says Des McNicholas.

ABOVE: Return to the 'Russians are bad guys' days.

ABOVE: Knives aren't effective against helicopters.

ABOVE: Time to stop pulling the trigger.

Online shooters are tough nuts to crack, thanks to the stranglehold of a small number of well established games. Global Operations, from Barking Dog Studios, mounts a decent challenge by mixing some of the best elements of traditional team-based play with a few worthwhile innovations. Despite the need for some major tweaking after release (fixed promptly by a patch) and a few server problems, Global Operations has quickly established a large and loyal player base.

It's not going to rival CounterStrike for straightforward action, but Global Operations' far stronger focus on teamwork and mission-style objectives will be a welcome change for jaded death-match veterans. Throw in an excellent respawning system, over 30 weapons that are fully customizable via the addition of extra parts, and 13 maps, and Barking Dog might just have produced the new experience we've been looking for.

Global Operations puts players into the role of a Special Forces soldier on duty in some of the world's hotspots, including Chechnya, North Africa and Western Europe, fighting against (or for) notorious groups such as the Marxist Popular Army, the Peruvian Revolutionary Front, and Columbian drug cartels. In an interesting twist for single play, players are assigned to different Special Forces (including Australian) depending on the mission. The single player game provides some good practice with 13 varied missions, and multiplay is via LAN, Internet or the built-in GameSpy Arcade. A very average tutorial is included, but players will quickly pick up the basics in the field.

Six main character classes are available: Medic, Sniper, Demoman, Recon, Commando and Heavy Gunner. The recon specialist is by far the most critical in multiplay as he comes equipped with a Life Signs Detector that highlights enemy locations to any nearby friendlies. Medics can restore health before death, snipers snipe, and demolitions specialists provide grenade launchers and the necessary pyrotechnics. Commandoes are equipped with assault rifles and rocket launchers to give a balance between heavy and light firepower, and the heavy gunner is slow but devastating at close range. It's a good mix overall, with most squads structured around a recon specialist, a medic and a heavy gunner. Unfortunately, players can't select their own team in single play, as other squad members are assigned automatically.

Missions in Global Operations include hostage rescue, assassination, base attack and defence, VIP escort and item retrieval. Unlike most online games, the missions are long and players respawn as a group at regular intervals. New weapons and upgrades can be purchased during the respawn process, using points earned for kills or completed mission objectives, or discarded weapons can be picked up on the run. It works well and ensures that you're not sitting around for 10 minutes waiting for the game to end. Players can also jump into observer mode while they wait, getting a feel for where the action is before they're dropped back in. Multiplay includes an excellent (but largely unexplained) Intelligence Officer class that can monitor the whole game via cameras and feed information to their team. All controlled areas and individual player viewpoints can be called up, and orders issued accordingly.

Global Operations is a terrific game that brings a few new ideas to a tired genre. The graphics and sound are admittedly average by today's standards, but the pace and style of gameplay are state of the art and the missions are well designed. As players mature with the concept, Global Operations may well emerge as an outstanding team-based title. At the moment, medics are used poorly (very frustrating to get shot next to one and watch them run on, rather than stop to help!), and the Intelligence Officer — potentially the best feature of the game — is hardly used at all. If the current level of online support is any indication, those problems will quickly disappear, enhancing what is already a great team experience.

9/10

GAME DETAILS

FOR: Real team focus; well designed maps; and a good mix of classes.

AGAINST: Graphics are not great at long ranges; poor tutorial; some omissions in the manual; and high-end system requirements.

REQUIREMENTS: Pentium III 500; 128MB RAM; 800MB HDD; 16MB DirectX video card.
RECOMMENDED: Pentium III 800 or better; 32 MB video card.
SOUND APIs: Direct Sound
VIDEO APIs: Direct 3D
DEVELOPER: Barking Dog Studios
www.barkingdog.com
PUBLISHER: Crave Entertainment
www.cravegames.com
DISTRIBUTOR: Electronic Arts www.ea.com
PHONE: Electronic Arts (02) 9264 8999

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McCANN XBOX32/ODD/B

Tony Hawk's Pro Skater 3

Des McNicholas gets heaps long air with some of the best skaters in the world. Like, Gnarly.

ABOVE: The art of synchronised skating.

ABOVE: The railslide requires deft balance.

ABOVE: Kickflip, Shaolin stylie.

The Tony Hawk franchise has been phenomenally successful: ranging from console and PC titles, to clothing, videos, boards and a language of its own. And why not? Skateboarding seems to be one of those fads that always bursts back onto the scene just as you think it's taken it's last gaping breath. So it's hardly surprising that Microsoft has chosen an up-gunned version of the PS2 hit game as one of their first Xbox release titles.

Activision knows a good port opportunity when it sees one, and Tony Hawk's Pro Skater 3 is a great example of how to do it well. This isn't the quantum leap over the PS2 version that fans expected, but it makes good use of the Xbox's extra grunt and brings a couple of exclusive tweaks for owners of the chunky black box.

The lack of online play in Hawk 3 is a disappointment (as in many of the Xbox's early releases), but developer Neversoft has partly made up for it with challenging single-play, a very smooth split-screen mode, and system-link for up to four players.

Single play options include a basic tutorial (narrated by Tony Hawk); a career mode that puts players into the role of a professional skater, tackling goal-based assignments around the world; frantic two minute single sessions chasing high scores; and free skate mode. The package is rounded out with a real-time 3D Skatepark Editor that lets players design the park of their dreams and test it on the hop.

Hawk 3 is all about grinds, combos, bluntslides and feebles, performed by the biggest names in world skating. All the champions from the PS2 version are on hand – including Steve Caballero, Elissa Steamer, and the great man himself – with each modelled in exceptional detail. The AI incorporates each of these skater's trademark moves and mannerisms, and players have the chance to improve individual stats as the game progresses.

If none of the included legends appeal, Hawk 3's Create-a-Skater option can build a future champion from the ground up, with players able to specify appearance, stance and performance against each of nine stats, including hang time, speed, rail balance and spin. Unfortunately there isn't a stat to represent the ability to handle the pain of a broken nose, caused by the stunning move known as the faceplant.

Neversoft has done an exceptional job with the physics of skating, producing smooth and believable motion in a game that has a remarkably fluid feel to it.

The rock-solid frame rate adds to the illusion, as does a terrific camera setup that catches the action without getting in the way. As a result, this is a tough game at the higher difficulty levels, and solving the necessary quests to gain skill points is no easy matter.

Bumps and crashes are handled well, punishing players for slightly misjudging the height of a rail or the hang time available for their grand finale.

In a nice touch, characters without padding make a bit of a mess when they hit the ground, while better-protected skaters get away with a grunt.

Hawk 3's environments are outstanding, ranging from the interior of a working foundry, to huge real-world locations. Canada, Rio de Janeiro and Tokyo are all on the list, along with an airport, a ship, 'skater's island' and LA during an earthquake.

The surroundings are a little plain at times, despite the use of active scenery, but the close-up detail is first-rate. Walls, ramps and footpaths are exceptionally well textured, and the view from 15 feet up is very impressive, imparting a nice sense of vertigo. Players are dragged into each level with small point-paying quests, such as catching pickpockets at the airport, squashing pumpkins, and unsticking tongues from cold steel!

Tony Hawk's Pro Skater 3 for the Xbox is by far the best in the series, although owners of the PS2 version might not see much justification for the extra dollars. The control system is well suited to the Xbox controller, load times show the benefit of a hard drive, and the chance to play your own music CDs is also a bonus.

This is in no way a cutting-edge Xbox release (and certainly not one that pushes the system to what it is capable of), but it is an excellent port of a game that was already a strong and very popular title.

8.5/10

GAME DETAILS

FOR: Great physics, first-class environments and a host of configuration options. Excellent skatepark editor.

AGAINST: A straight port rather than anything new, and no online play.

DEVELOPER: Neversoft Entertainment www.neversoft.com
PUBLISHER: Activision www.activision.com
DISTRIBUTOR: Activision www.activison.com
PHONE: Activision (02) 9869 0955

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Acclaim®

Warlords: Battlecry II

Des McNicholas returns to the land of Etheria for SSG's latest RTS and RPG title.

ABOVE: Daemons are really not very nice at all!

ABOVE: Things that make you go Boom.

ABOVE: The interface is a bit of a screen hog.

New ideas are hard to come by in the real time strategy arena, but the original Warlords: Battlecry showed that they could be about more than chopping wood and building farms. More importantly, it was a genuine 'cross-over' title, that presented elements of role-playing, through the introduction of skills-based Heroes, that could be carried across scenarios and into multiplay. Australian developer SSG has built on that success by improving many aspects of the original and introducing a few new ideas. Warlords: Battlecry II is part upgrade and part expansion, and one that will please owners of the first instalment as well as those keen to try out the Hero system. It comes with a reasonably comprehensive manual, and a host of CD-based documentation for those with a taste for detail.

SSG has dispensed with a story this time: instead it presents players with a world to conquer and skills to learn. The single player campaign presents a map showing the 67 regions of Etheria, from which players must choose where to attack. Each mission is essentially a skirmish game against one of the game's 12 races, with victory rewarded by improved skills, conquered nations, and volunteers for the next battle.

A total of 47 regions must be captured to win the coveted Orb of Etheria, with each region offering unique benefits (such as specialist troops or upgrades), and players must also protect their gains from other would-be rulers. Skirmish mode is available against up to five AI opponents, and multiplay supports modem, LAN, Internet and Ubi.com. Battlecry II brings an interesting mix of races: the slow but strong Undead; fierce but thick Barbarians; cunning High Elves; and the evil Daemons. Each race has its own attributes and specialist units, and each can serve under any Hero. Although building styles are different for each race, SSG hasn't quite managed to create a unique atmosphere for good and evil, and there's not that much to separate them in the early stages of the game. The graphics look a little dated, but the maps are varied and colourful, and terrain has a major impact on tactics. Over 120 units are available including builders, assassins, dragons and giant spiders; and SSG's group control interface is first-rate. An all-conquering Titan has also been included for each race, but the time and cost necessary to build them means that they're not seen too often.

Heroes lie at the heart of Battlecry II's unique approach to real time strategy, with players choosing their alter-ego at the start of a campaign and slowly gaining experience. Heroes can build structures, convert enemy buildings and resources, undertake quests, and boost the performance of friendly troops in range. At level 2, players choose a profession for their Hero – Warrior, Wizard, Rogue or Priest – after which they focus on improving a range of special abilities. Once a Hero is created, experience points can be earned in all modes of play (including skirmish) and carried over to other games. In another interesting twist, a small retinue of key units can be assembled and taken from each scenario to the next.

The role playing and progressive nature of Battlecry II breeds more attachment to individual units than is usually the case in an RTS, calling for a little more thought before charging the ramparts. SSG has implemented an excellent magic system, based around 10 spheres or schools, with spells able to raise the dead, summon creatures and harness nature. Even the weather can be controlled, and some units have the power to inspire awe, strike terror, and spread disease. The overall mix of weapons available to players is quite remarkable (particularly once other races have been conquered), resulting in some very interesting battles and a few nasty surprises.

Surprisingly, the AI doesn't really shine, but online play poses some very tough challenges.

Warlords: Battlecry II has improved significantly on the original and does an even better job of mixing the RTS and RPG genres.

8.5/10

GAME DETAILS

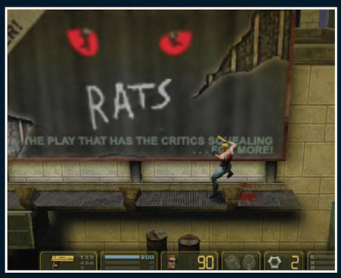
FOR: Excellent Hero system; good use of magic; largely automated resource gathering; and good formation commands.

AGAINST: Dumb AI; average graphics; some of the CD-based documentation is needed in hard copy; and not sure the Titans add to the experience.

REQUIREMENTS: Pentium II 350; 64MB RAM; 850MB HDD; 8MB DirectX video card.
RECOMMENDED: Pentium III 450 or better; 128MB video card.
SOUND APIS: Direct Sound
VIDEO APIS: Direct3D
DEVELOPER: SSG www.ssg.com.au
PUBLISHER: CDV www.cdv.de
DISTRIBUTOR: UbiSoft www.ubisoft.com
PHONE: UbiSoft (02) 8303 1806

Duke Nukem: Manhattan Project

James Cottee has come to kick arse and chew bubble gum... except he's all out of arse.



ABOVE: One of the game's comedic highlights.

ABOVE: 'Hi Duke, we've missed you!'

ABOVE: A special effect.

'When it's done.' When it's bloody well done. That's the official line from 3D Realms on when we can expect Duke Nukem Forever to be available to buy and own. The word on the street is that 3D Realms will finally give a release date at this year's E3, but we've heard too many platitudes to care anymore. It's been six years, after all. Six long years. Can anyone say 'Vapourware'?

Sure, Duke Nukem 3D was revolutionary. It was dynamic, irreverent, piss-funny, and packed full of bloody gibs. But it was so long ago that most of us didn't download it off the Internet, but rather the local BBS. Waves of other revolutionary shooters have pushed its memory to the back of the mind, ready to fall off into nostalgia and oblivion.

For those too young to remember, Duke Nukem is the self-styled guardian of planet Earth. Not because he's some kind of tree-hugging Captain Planet wannabe, but because this is the place where all his favourite strip clubs are. Slavering aliens bent on enslaving our women-folk frequently invade the near-future setting Duke inhabits, and it's Duke's duty to stop them.

His vocal clichés are ripped off wholesale from Ash in the Evil Dead films, and his weaponry ranges from a gold-plated Desert Eagle to pipe bombs, shrink rays and RPGs.

This new 2D platform game takes the characters and situations of the Duke Nukem universe, and squeezes them into a highly convoluted linear action-adventure. Which blows.

Certainly, the player gets to mess around with all of Duke's weapons, blow away countless pig-cops, S&M assassin babes, barrels and crates – and you even get to fly around in on his jetpack (whoopee!) – but the key words in the description are '2D', 'linear', and 'platform game'.

Duke Nukem: Manhattan Project has eight stages, each made up of three levels. Which makes a whole 24 levels of boredom for those of you who are mathematically impaired.

While most of the action entails the usual platform fodder of climbing ladders, jumping ravines and finding keys (those are the highbrow levels), some of the levels involve repetitive Simon-Says antics, and these are not so much cognitive challenges as exercises in wasting time. Much like the rest of the game, really.

Through Duke you become an experimental lab rat that has to find its way out the maze. If there was spyware built in, this software could be a powerful tool for assessing the motor skills of the gaming public.

The graphics are certainly rendered in 3D and static backdrops are greatly enhanced by sets elaborate enough to feature perspective and parallax. Sometimes the screen will bend around as Duke navigates a circular room, or take a sharp corner to break up a decrepit city skyline.

But the play mechanics are classic 2D platform fare, with nary an innovation to be seen. One could compare it to Commander Keen, or even Janitor Joe, but it would be a disservice to these early classics. They didn't have voice samples, but at least the graphics were clear enough for players to see where they were going.

Indeed, aged gamers may recall Duke's very first adventures, which were also platform games, but they were quirky, innovative and a far cry from the dingy realm of Manhattan Project. Thus this latest Nukem adventure seems to have done the impossible: it has crossbred the latest in graphics technology with a meme as old as time, retaining only the worst properties of each. Nice work. Manhattan Project is certainly playable, follows its own internal logic and even includes such modern conveniences as quick saving, but to the Nukem party-faithful, it misses the point completely.

We all have moments of weakness – and many will be tempted. The lingering promise of a new One Must Fall, a new Elite, even a new Last Ninja lie before us, and all seem more likely than an in-store display for Duke Nukem Forever at the Harvey Norman.

Manhattan Project is full of challenges, puzzles, and even the odd surprise. But we've all been there before. Many, many times.

5.5/10

GAME DETAILS

FOR: Duke Nukem; babes; pig cops; pipe bombs, etc.

AGAINST: Incredibly repetitive; simplistic; frustrating; boring; and utterly redundant.

REQUIREMENTS: Intel Pentium II 350MHz; 64MB RAM; 300MB HDD; and 8MB video card.
RECOMMENDED: Intel Pentium III 500MHz; 192MB RAM; and 16MB video card
SOUND APIS: Direct Sound.
VIDEO APIS: Direct3D; Open G.
DEVELOPER: Arush Entertainment www.arushgames.com
PUBLISHER: 3D Realms www.3drealms.com
DISTRIBUTOR: Manaccom manac.com.au
PHONE: Manaccom (07) 3870 9440

Dungeon Siege

George Soropos chooses not to be a Liberal or an Elf in Microsoft's D&D.

ABOVE: Spell effects are a highlight of the graphics.

ABOVE: You can zoom in for a better look.

ABOVE: Doing some overtime as a cage dancer.

The copycat syndrome has long afflicted Hollywood and the music industry and seems set to become a fixture in the games business as well. Years ago Blizzard hit upon a winning formula in the form of Diablo, a groundbreaking action RPG that replaced the ponderous puzzle and story driven aspects of the genre with non-stop mouse clicking carnage. A little later Black Isle hit on another winning formula in the form of its party based and AD&D inspired Baldur's Gate series.

Microsoft wasn't about to let someone else make all the dollars in this successful but relatively exclusive market and Dungeon Siege is the result. Siege combines the instantly accessible mouse clicking combat action of the Diablo series with the versatility of a party based system similar to the best selling Baldur's Gate.

The game is less story driven than the Black Isle series and focuses more on almost non-stop combat and character development in the traditional form of level raising and ability honing. Gas Powered has chosen not to include a plethora of character and race types – just the Dungeons and Dragon basics – such as Elves, Dwarves, Half Orcs, Humans and Liberals, and the only three classes are sword swingers, archers and spell chuckers.

In order to refine your characters you need to give them extra abilities and keep working on them when you level up. So if you want a thief you'd give a character the trap detection and lock picking abilities and crank them up with your level up points.

There are only two flavours of magic: combat magic and nature magic. Nature magic tends to focus on mainly healing and protection spells with some offensive numbers thrown in and its knowledge makes a character the equivalent of a Cleric type. Combat magic obviously has all the spells that go bang, so therefore expertise in this area will make your character into your typical wizard guy.

As you can see there is little variety in both races and class types, so while it makes online play more balanced it can seem a little more dull than necessary. The developer has also unnecessarily simplified the AI scripts controlling your party.

Some of the better features of Baldur's Gate were its customisable AI scripts that allowed you to have an acceptable level of control over your party's action when you weren't in direct control. Dungeon Siege has similar scripts but in a very simplified form: you can only set your party's desire to chase an enemy or fight from where they are; to hold fire, defend or attack all enemies; and tell them to attack the weakest or strongest enemy. There are no orders to defend magic users or to use offensive or defensive magic for example, which can make the management of your party more than a little annoying at times.

Item obsessives should also note that Siege isn't a Diablo style treasure hunt with endless variations on different types of armour and weapons to swap and steal from other players. There are relatively few items to be found and therefore, possibly, less reason to player kill everyone in sight.

Dungeon Siege is certainly one of the prettiest looking RPGs on the market but its graphics engine hides a little secret: its res is limited to 1024 X 768 X 32. Who cares if you've spent $900 on the latest GF4 card, or that you have a 2GHz beast with 512MB of SDRAM? Not these guys. The engine doesn't even use the latest DirectX 8 effects but has been made with low-end speed in mind. There's nothing wrong with that, but how about including the quality option for those who care about such things? However, those who do have a GeForce3 or better will be able to run the game with antialiasing enabled without their framerates plummeting, resulting in even prettier graphics.

Dungeon Siege is a great option for Diablo players looking for a new challenge or a game with a little more complexity, but should be looked at more carefully by the hardcore RPG fans who prefer mind bending puzzles and a good story. Some folk might find that the repetitive nature of this game isn't to their liking.

8/10

GAME DETAILS

FOR: 3D game world; streamlined interface; Pack Mule.

AGAINST: Res limiter; Elves; AI scripts seem too limited.

REQUIREMENTS: Pentium II 400; 64MB RAM; 8MB video; DirectX 8 sound; 56Kb/s modem.
RECOMMENDED: Pentium III 800+; 128 MB RAM; 32MB video.
SOUND APIS: EAX; EAX2; DirectX 8.1; A3D
VIDEO APIS: DirectX 8.1
DEVELOPER: Gas Powered Games www.gaspowered.com
PUBLISHER: Microsoft www.microsoft.com
DISTRIBUTOR: Microsoft www.microsoft.com
PHONE: (02) 9870 6800

Wreckless: The Yakuza Missions

Assertive driving lesson #1: Smash it up, with Des McNicholas.

ABOVE: Now that's what you call carnage!

ABOVE: The reason seatbelts exist.

ABOVE: Road-rage in Hong Kong is hardcore.

Wreckless: The Yakuza Missions received a lot of hype during its production, with developer Bunkasha promising to push the Xbox to its limits with detailed cities, fast cars and a huge amount of smashing and crashing. It's fair to say that Wreckless delivers on that promise, with huge environments, a great frame rate and some stunning special effects.

That said, this is racing and gaming at its most basic, and some players will be disappointed with the lack of configuration options, the very simple driving physics, and the short length of the campaigns. Others will enjoy Wreckless for what it is: a super fast, arcade-style smash-em-up.

Wreckless throws players onto the mean streets of Hong Kong in a driving battle to the death with the nefarious Yakuza crime syndicate from Japan. Two very short, ten-mission campaigns are available, driving a series of progressively better cars on a bizarre mix of incredibly difficult and ridiculously simple missions. And when we say difficult, we're talking the throw your gamepad through the TV variety.

Players can choose to be either cops or spies, although the gameplay is pretty much the same either way. Remarkably, given the nature of the game, no multiplayer option is available – even a split-screen option would be a major bonus. An excellent replay mode is included, which display some of the most awe inspiring graphics yet seen on a console, and it incorporates some terrific camera angles along with a simple save feature.

Players having trouble coming to grips with the Xbox controller need not worry anymore. Wreckless has the easiest control setup you're ever likely to see: forward, reverse, left, right and, though you won't use it much, brake!

The Y button activates the odd door or elevator, and a combination of acceleration and braking produces powerslides around corners. Not surprisingly, driving is tough at very high speeds, but at least most of the scenery can be smashed out of the way.

The game resets car positions if things get out of control, although it doesn't always seem to work, and players will occasionally find themselves stuck in a corner with nowhere to go.

14 cars can be unlocked, most of which have similar handling characteristics, and top speed seems to be the main difference, as many of the missions are speed challenges against the clock.

Missions allegedly range from ramming cars, to rescuing scientists and taking photographs, but they basically come down to driving fast, weaving through traffic and smashing things up. The vehicles are exceptionally well modelled, and the damage effects (which have no impact on handling) look absolutely superb.

People and vehicles react appropriately, jumping out of the way and wrapping themselves around things, although Bunkasha has ensured that no-one gets killed.

Wreckless makes use of the Xbox's horsepower to produce incredibly detailed cityscapes and a terrific feeling of speed. The streets are full of people, cars and shops, and numerous narrow lanes and sharp turns give players every chance to have a close look. The framerate stays constant regardless of what's going on around the place, and most of the levels are spread over huge areas. The odd ramp or rooftop offers the chance to grab some air and see the city from above, and the general lighting effects are first-rate. The night missions stand out particularly well, with streetlights, neon signs and enhanced explosive effects.

Wreckless is great fun to play, despite the simple driving physics and the lack of any real configuration options. The missions are fast and furious (and often humorous), and the essentially arcade style is made up for by stunning graphics and outstanding damage effects.

This is a very easy title to get into, and one that well and truly puts the Xbox through its paces. The key fault lies in the lack of a multiplay option – often the main reason people buy consoles in the first place – which means the long-term value is reduced. Longer campaigns, better music and more consistency in mission difficulty would also help, but Wreckless: The Yakuza Missions is one of the most enjoyable early releases for the Xbox.

8/10

GAME DETAILS

FOR: Looks fantastic; simple controls; great fun.

AGAINST: Too short; no multiplay; only average music.

DEVELOPER: Bunkasha
www.bunkasha-games.com
PUBLISHER: Activision www.activison.com
DISTRIBUTOR: Activision www.activison.com
PHONE: Activision (02) 9869 0955

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YET TO BE CLASSIFIED

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WarCommander: Rangers Lead the Way

George Soropos goes all the way with the US Rangers.

ABOVE: The graphics simply do the job.

ABOVE: There is plenty of foliage to hide in.

ABOVE: What it all boils down to - destroying stuff.

When Col. William Darby formed the US Rangers during WWII he wanted to give the US Army an elite assault force like the British Commandos but one that could be used for regular operations as well as special ones.

The Rangers were the first ashore at the Anzio landings in Italy and at the D Day landings as well. Their job was to clear the beaches of mines, tank traps and barbed wire so that the troops landing behind them could run straight to cover. If that sounds a little crazy then you'll know what to expect from War Commander.

CDV has based War Commander on its tried and tested Sudden Strike engine, but there are quite a few differences in design between the two games. As War Commander limits the number of troops under your command your workload will be easier than it was in the incredibly manic Sudden Strike series, and because of that a new interface has been thrown in to allow you more direct control of your troops.

Each Ranger is represented as a symbol on your HUD, with the different unit types each having different and easily identifiable symbols. There are machine gunners, regular soldiers, medics, snipers, scouts and bazooka men, just to name a few of the eleven classes available to you.

All your men gain experience as they go through combat - therefore keeping as many of your veterans alive as possible is a desirable goal if you want your men to improve themselves. A crew of experienced soldiers will wipe the floor with a bunch of green rookies.

The combat environment can be as lethal as the enemy, but it can also be your friend. The terrain incorporates a fairly realistic physics model so don't try throwing grenades up a steep hill as they're likely to roll straight back down on top of you! Rain reduces visibility, footprints and tank tracks can give away the enemies position, and line of sight is also very important.

As with all the Sudden Strike games your range of vision is crucial. If you play War Commander like any other RTS and just charge your men forward en masse the ensuing carnage as they stumble into a well positioned enemy ambush will no doubt be enough to put you off your lunch. The proper use of scouts, snipers and their camouflage ability will be a great aid to clear the way ahead of you.

As overall Commander you also have engineers at your disposal to build fortifications and traps in order to protect your men from counter attacks, which are constant threats after the allied beach landings, but as the Ranger's job is assault there won't be too much time for digging in. Once you fight your way off the Normandy beaches your goal is to then strike inland and secure key towns and bridges. Easier said than done.

To this end the game has a wide variety of well designed maps, which also come in handy during the multiplayer operations. Up to eight players can play online or on a network and there are three game types to play: Capture the Flag, Last Man Standing and the really imaginative Capture the Flag Five Times.

You can also choose what kind of team you'll have under your command: builders with lots of engineers, scouts and snipers or soldiers and heavy infantry. This is the best way to play the game as human opponents are a lot more forgiving than the dreaded computer AI.

War Commander is a game of careful consideration and planning, though it can look deceptively simple. If you don't think about what you're doing and don't learn to play the game properly it will be a very, very frustrating experience. But if you put in the effort and learn how to use the correct tactics, War Commander will reward you with an engaging and complex challenge.

By the way: for all you movie fans, the best film about the Rangers is *Darby's Rangers*. directed by the great William 'Wild Bill' Wellman and made in 1957. Like all Wellman films it's a must see for any and all war movie buffs out there. To get your hands on it have a look in the Warner home video catalogue. You won't regret it.

7.5/10

GAME DETAILS

FOR: Any Windows; Pentium II 450; 64MB RAM; 600MB HDD.

AGAINST: Graphics are not great at long ranges; poor tutorial; some manual omissions.

REQUIREMENTS: Pentium III 500; 128MB RAM; 800MB HDD; 16MB DirectX video card.
RECOMMENDED: Pentium III 750; 128MB RAM; 21" monitor.
SOUND APIS: DirectX 8
VIDEO APIS: DirectX 8
DEVELOPER: Independent Arts
www.independent-arts-software.de
PUBLISHER: CDV www.cdv.de
DISTRIBUTOR: Red Ant
www.heininger.com.au/red-ant-enterprises
PHONE: Red Ant (02) 9882 1222

Heroes of Might & Magic IV

We don't need another hero, asserts James Cottee.

ABOVE: The new interface is super-efficient.

ABOVE: It looks like an RPG – but it's not!

ABOVE: Treasure hunting and orc slashing fun.

Here we have one of the more curious video game species: a spin off product that has surpassed the original franchise in quality, depth, and replay value. While the core Might & Magic series is made up of conventional RPGs, Heroes is an extraordinary turn-based strategy game. It's a gaming system that distinguishes itself on strategic scale, tactical complexity, and endless customization; and it's capable of single or multi-player contests.

Each game is based on a map symbolising a rich fantasy realm of mysterious citadels and treacherous woods. Towns and structures fly the flags of their rulers, and the objective is usually to spread your colour across the map. Each side fields armies that can be made up of a wide variety of fantasy races with special abilities, melee and ranged attacks, field equipment, weapons and spells.

Legions of orcs can be felled in a single sweep, but your heroes are crucial to the game: each can be fitted out like in any normal RPG, and they can also gain levels, wield magical items, learn spells, and turn the tide of battle. A hero can hold one of eleven classes and six alignments.

Heroes III was a worthy and commendable game, but it bore a visual paradigm that dates back to The Ancient Art of War: maps were top-down grids and battles were side-on affairs that had all the graphical realism of pre-Renaissance wall hangings. Heroes IV finally enters the 20th century by incorporating an isometric, view.

Wandering around the map will inevitably lead one into combat, which combines a high degree of preparation and tactics with higher degrees of uncertainty. For while the most powerful unit in an army is clearly visible on the map screen, and a right click will give the gist of the army's size, there can be up to six different unknown quantities in any force. If you've invested too heavily in melee weapons, a barrage of arrows can decimate your forces. Likewise, lack of magic resistance, low speed, and being totally outnumbered can really hinder your plans.

The way to victory is to carefully marshal your forces, explore and exploit every bonus on the map, and strike only when you feel sure of success. It might take tens of hours to sweep the map clear but the rewards are enormous. This is the essence of turn-based strategy: beard-stroking, brow-furrowing, and amiable bantering at the gentleman's club when it's done. The comparisons to Civilization III don't end there: each city is begging to be upgraded, so it can churn out more and more powerful units and items, better defend itself, and look more impressive on the city view screen.

Seven different resources need to be gathered and hoarded to this end, but by far the most useful is the glimmering stuff commonly known as gold. Gold hires soldiers, and can also bribe a victorious army to let you escape from certain death.

Heroes IV also introduces improvements and upgrades beyond mere graphical finery.

Heroes have new abilities and new depth compared to previous versions. They can lead armies and govern cities, and face off against scores of new species of combatants. A random mission generator complements the campaigns and scenarios, and the interface is smoother and more logical than before. Add to this some high quality music which is both unobtrusive yet impossible to ignore.

This is a monster of a game. While the gist of play can be absorbed in hours, it would take months or years to get every last drop of tactical fun out of it. Fans won't be disappointed – there's enough here to keep them going until Heroes V. Anyone else who enjoys turn-based strategy will want to check it out. This is a game with the lot: strategy, tactics, role-playing, and a chrome-plated dual-tub kitchen sink.

9/10

GAME DETAILS

FOR: Superb strategy formula; stunningly atmospheric music; level editor + rabid fan base = unlimited new custom missions online.

AGAINST: Not the best graphics in the universe; tactical display can be confusing; holds same lifestyle-absorbing power as Civ 3.

REQUIREMENTS: Pentium II 300MHz; 128MB RAM; HDD min 750MB; 4MB DirectX compatible video card.
RECOMMENDED: Pentium III 450MHz, 256MB RAM, HDD min 750MB, 4MB DirectX compatible video card.
SOUND APIS: Direct Sound
VIDEO APIS: Direct 3D
DEVELOPER: New World Computing
www.3do.com/corporate/nwc
PUBLISHER: 3DO www.3do.com
DISTRIBUTOR: Take 2 Interactive
www.take2games.com
PHONE: Take 2 Interactive (02) 9482 3455

We fixum brokeney bits

Nothing ever goes right. That's why we dig computers, they keep us busy, off the scary streets, away from the horrible outside, safe from the evils of public transport. Beautiful. LOTM wins a Debut case from Dilithium (www.dilithium.com.au). woot.

The enemy within?

Ever since I started building computers and finding out that magnetism isn't good for any components – especially hard drives – I have always wondered why the PC speaker within a computer case is most of the time mounted very close to the hard drive.

I find PC speakers are one of the most magnetised things I have ever seen: try holding one up to a monitor if you don't believe me – now that can't be at all good for your hard drive, can it?

Most of the time I just take the PC speakers out of systems I build just to be safe, and I see no real need for them now in modern computers.

All of the ones I have removed from systems act as fridge magnets :-).

Am I right, or am I just worrying for nothing?

Evan Richardson

Point one: If you think the dinky ceramic magnet assembly on the back of a PC speaker is a highly magnetised thing, you may find my page at www.dansdata.com/magnets.htm more than a little amusing.

Point two: It's not a problem.

The way to wipe data on magnetic media is by applying a field beyond a certain threshold strength, determined by the kind of magnetic media you're talking about, and then causing that field to oscillate.

A hard disk platter spinning through the field created by a small magnet will experience considerable changes in the relative field strength over each part of its surface as it rotates. Which passes the second test. PC speakers all fail the first test, though, even if you press them up against the outside of the drive. They're just not strong enough.

The coercivity (field strength needed to erase data) of a modern hard disk platter is a few thousand Oersteds: you need a magnetic field strength of exactly the same number of Gauss to affect it. If the field strength is below the coercivity, it'll make no difference at all to the data. It won't slowly wear it away over time. It'll do nothing. Welcome to quantum physics, please enjoy your stay.

As a general rule of thumb, magnetic field strength drops off as the inverse cube of the distance from the middle of the magnet. That's not exactly how it works, but it's all you need to know for computer-protection purposes.

A ferrite-magnet speaker will have a peak field strength, measured right on the magnet surface, of about one thousand Gauss. That's already too little to hurt a hard drive. Move a centimetre or two away, which is where drive platters will be relative to the magnet if the speaker's resting on top of the drive casing, and you'll already be down to a couple of hundred Gauss, if that.

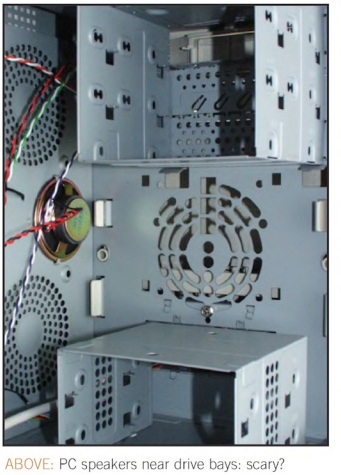
In a normal PC case, even one with a drive cage right over the speaker, no part of the platter will see more than a hundred Gauss. Plain 3.5 inch high density floppies have a coercivity of 720 Oersteds – you can't even wipe a floppy with a speaker magnet that isn't almost touching it.

On top of all this, some PC speakers are magnetically shielded, with a second, reversed magnet glued onto the back of the main magnet assembly, usually under a metal cap. They haven't got much external field, no matter where you measure it.

The tiny electromagnets in disk drive write heads manage to do their job because the strength of their weeny little field is actually rather high, and they're very, *very* close to the platter.

Rare earth permanent magnets have a surface field strength of about 10,000 Gauss, so laying a good-sized one of those on top of a hard drive might well wipe some data.

But ferrite speaker magnets haven't a hope, no matter where they are.



ABOVE: PC speakers near drive bays: scary?

Multi-monitor woes

I have a Stealth 64 PCI Graphics 2001 series VGA card and a 64MB GeForce2 MX400 in my AGP slot, and I tried setting up dual monitors on my PC. I changed the first boot graphic card to AGP, and that was fine, except that I didn't have drivers for the Stealth 64. I went to a million and one sites, including the Diamond one, and to my dismay they stopped making drivers for that card after Win95. I tried the WinNT drivers as well but they didn't work. Is there no way to make it work?

Louis Turner

The list of secondary display adaptors that WinXP can natively support for multi-monitor operation is pretty short. You can read the 'List of Supported Display Adaptors for Multiple Monitors and Dualview in Windows XP' here:

http://support.microsoft.com/default.aspx?scid=kb;EN-US;q307397

Your card has an S3 864 chipset, and isn't on the list. It isn't even listed in the Windows Hardware Compatibility List (www.microsoft.com/hcl) as being compatible with anything after Win98.

Often, old graphics cards can be used with newer Windows versions – you just have to find a reference driver that matches the graphics card's chipset, and not bother with the un-updated drivers from the manufacturer of that particular card.

In this case, though, you're out of luck. Your two dollar video card ain't gonna work in WinXP, for anything.

There are, however, various other cheap cards that'll do the job for you: any old NVIDIA-chipset card since the TNT will do, and several other well-known chipsets.

Cross-reference the abovementioned 'List of Supported Blah Blah Blah' with what's on sale cheap via your local computer market/Internet auction site/Trading Post paper, and you ought to be able to find something decent.

Macinboard

Is it possible to plug an Apple USB keyboard and mouse into my PC and vice versa? I really don't mind the look of the Apple Pro Keyboard.

Ben

Apple USB keyboards work fine on PCs with all vaguely recent flavours of Windows. You even get working Control, Alt (Option) and Windows (Apple) keys. PC USB keyboards, similarly, should work with a Mac.

The same goes for the mouse, except that any standard Apple mouse will only have one button, which is no good for Windows. An after-market multi-button USB Apple mouse ought to be perfectly useable on either platform.

Nobbled network

I am really having some fun trying to get my home network to function properly. The IPX/SPX and NetBeui protocols work fine, so I can share files and play games and stuff, but I really want to use Internet Connection Sharing, and TCP/IP won't work.

I have four computers on my network (star topology – 10Mbps hub): three '98 machines and one '95 machine. I am assuming the network cards work fine, because the other protocols work fine. Two computers can ping each other. And the other two computers can ping each other. But none of them can ping outside of their pair.

I have checked the IP addresses. I have checked the subnet mask (10.1.1.x and 255.255.255.1 respectively). I have no idea what else could be going wrong. Got any hints?

Emma

Try changing your subnet mask to 255.255.255.0. If it ends in anything but .0, you've made a discontiguous subnet mask.

I could explain what that is, but then I'd put myself to sleep, let alone you lot.

DDR: worth it?

I am about to upgrade my computer, and am thinking of getting an AMD Athlon XP 1800+ processor.

I was thinking of getting a motherboard that uses SDRAM (so that I can use the RAM from my current computer), but found that there aren't that many that support SDRAM as well as XP processors. Is there a significant difference between SDRAM and DDR RAM that's worth the extra money? Could you also suggest a good motherboard for the two types of RAM?

Mark Williams

First up, DDR memory is SDRAM (Synchronous Dynamic Random Access Memory). DDR stands for Double Data Rate; it means the memory transfers data twice per clock tick, allowing it to achieve twice the theoretical bandwidth of Standard Data Rate RAM running at the same bus speed. DDR and SDR are both flavours of SDRAM.

For Athlon systems, DDR is definitely worth the extra money for people that're going to be buying new RAM either way.

It only costs slightly more than SDR memory nowadays. You, however, already have some SDR memory you'd like to use. That makes the decision less simple.

How much of a speed advantage you'll get from DDR depends on the motherboard you have, and what you're doing. Some tasks don't lean on RAM bandwidth at all.

For 3D games and other heavy-duty computing, though, you can expect to see 30-60% better real world performance from a current PC2100 DDR system, compared with a PC133 SDR one.

The early AMD-CPU DDR chipsets weren't too thrilling, as we found in some of the earlier editions of Atomic, but current models work well, and there are various good boards that use them.

VIA Technologies' KT266A and KT333 chipsets are the standouts as I write this; get an Abit KR7A, Asus A7V266 or MSI K7T266 Pro2 and you'll probably be very happy.

If DDR's extra speed doesn't sound as if it's worth the money to you, then feel free to grab an older SDR Socket A board which supports Athlon XPs with a recent BIOS revision. There is no need to buy new RAM, and a cheaper motherboard, too – SDR boards are more than $100 cheaper than otherwise similar DDR ones, as I write this.

There are a decent number of good options in this area.

The Abit KT7A and MSI K7T Turbo2 are still easy enough to find, for instance. At time of writing, they've got BIOSes available to support Athlon XPs up to the 1900+ and 2000+ ratings, respectively. There's no word yet on support for the new Athlon XP 2100+.

Driverless Directcom

After an HD failure I replaced the drive with a new one and loaded the software that I have, only to find I was missing a driver for my internal Directcom modem (ID: 52PT-3511). After searching the Net and failing to come up with anything, I am now contacting you hoping that you may have more luck.

Shane

The device with FCC ID 52PT-3511 is a Rockwell-chipset host-based modem (a 'Winmodem'), which is why you have to have a driver for it. Host-based modems use the system CPU to do most of the work, which is an OK strategy with modern high-speed processors, but unfortunately it means they won't work if you don't have the correct driver. Normal 'hardware' modems don't need any special driver. Windows has what it calls drivers for hardware modems, but the driver is basically just an initialisation string. Most hardware modems will work fine with one of the generic Windows modem drivers.

Directcom doesn't exist any more, but that's not a problem – Directcom modems were actually made by Puretek. A few other manufacturers also used this particular Rockwell chipset. You can get Windows 95, 98, NT and 2000 drivers, which are only a small download, for Puretek's version of this modem from the following linkage: www.puretek.com.tw/e-version/download/download-pci.htm

Bin gone

HELP! I don't know how the hell I did it, but I accidentally deleted the Recycle Bin off my desktop and I don't know how to get it back! I can't even access the recycle bin through Explorer – the 'Recycled Items' directory doesn't exist. I've tried searching for derivatives of the words 'recycle bin', but I found nothing. I also tried to undelete through DOS, but still nothing. I don't even know the file extension for the recycle bin, let alone what the file is called, which makes searching harder. The weird thing is that I can still empty the recycle bin using the context menu (obtained from Winboost2000; Right click -> 'Empty Recycle Bin') – and it works. I tested it by creating a new folder, deleting it then using the context menu command. I don't want to have to re-install everything just for a garbage bin!

Kevin Mendoza

Removing and restoring the special desktop icons – My Computer, Network Neighborhood, the Recycle Bin and so on – is one of the many functions of Microsoft's Tweak UI utility. Tweak UI has a Desktop section that lets you check and uncheck boxes to make the icons come and go when your system's behaving itself; if the desktop icons get messed up, there's also a Repair section.

You can get the one-size-fits-all latest version of Tweak UI for every flavour of Windows from: www.microsoft.com/ntworkstation/downloads/PowerToys/Networking/NTTweakUI.asp.

A superlative suggestion, with just two minor flaws.

A few correspondents wrote in to commend me on my recommendation, in Issue 15's I/O column, that Windows 2000 users use the Microsoft 'msconfig' System Configuration Utility to change what runs when their computer starts up.

Well, except that, one, Win2000 doesn't come with msconfig, and two, Win2000 doesn't come with msconfig.

Ahem. Yes. I'd completely forgotten that the msconfig utility I used so often in Win2000 didn't actually come with the OS. That's because Windows XP's msconfig works in Win2000, and versions of it from XP betas were, amazingly, available for download all over the Internet long before WinXP itself ever went on sale.

Stick the XP msconfig.exe into the Win2000 \winnt\system32\ directory, and you're away. The system32 directory is part of the standard search path for commands, so now clicking Start, selecting Run, and typing 'msconfig' will give you the program, just as it does in WinXP. Particulary enthusiastic users may care to create a desktop shortcut.

I, of course, don't for a second recommend you get XP MSConfig from a Website, or indeed from your favourite P2P application, like for instance the bespoke little client available from http://www.kazaalite.tk/.

Because it's part of WinXP, which means you should pay for it. You do know that the computer scientists working at Microsoft get paid less than the average burger flipper at McD's, don't you?

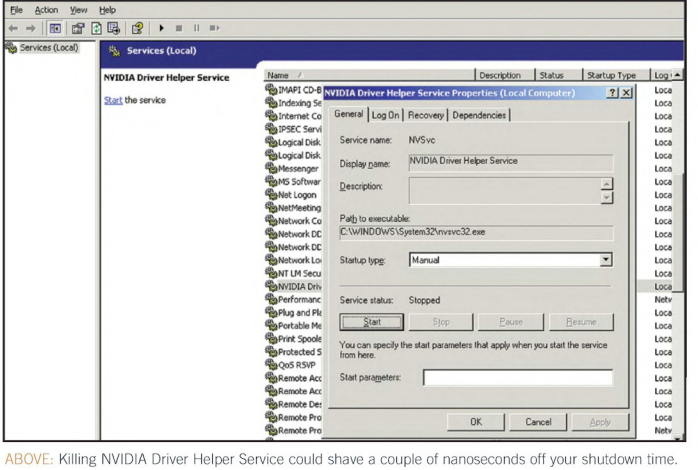
Handy household hint #2763

Running Windows XP? Got an NVIDIA graphics card? Want to make your computer shut down a bit faster, and maybe avoid some crashes?

Go to Control Panel -> Administrative Tools -> Services, and find 'NVIDIA Driver Helper Service' in the list.

This Service exists to apply custom gamma settings in the Control Panel, handle your TwinView settings, and so on. Which means that most people who are running it don't need to.

Stop the service and set its startup type to 'manual', and the blighter won't run unless you decide to change its settings back again.

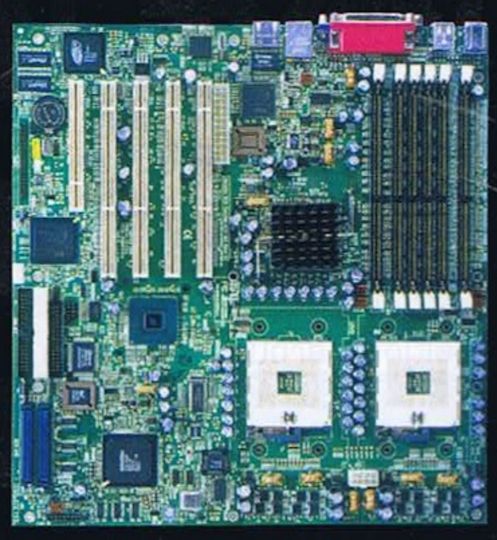


ABOVE: Killing NVIDIA Driver Helper Service could shave a couple of nanoseconds off your shutdown time.

Best of the Best

DOS/V magazine AWARD 2001 Best of the Best March 2002

Recognized by DOS/V Magazine Japan with their "Best of the Best" 2001 award.



Thunder i7500 (S2720)

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- Intel® E7500 chipset supports 400MHz system bus
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- Adaptec® dual-channel U160 SCSI option
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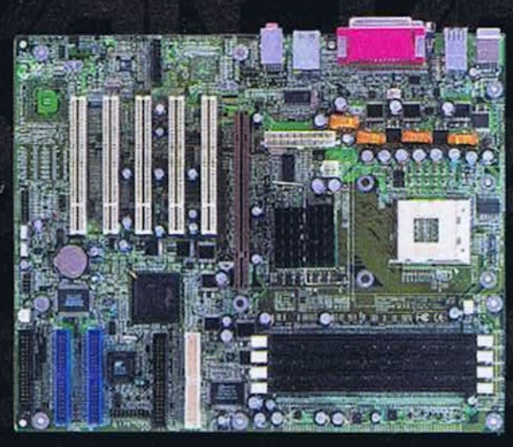
- ATIR RAGE™ XL graphics controller
- EPS12V power; SSI form factor



Trinity i845E (S2099)

- Supports one Intel® Pentium®4 processor, mPGA478
- Intel® 845E chipset supports 400/533MHz system bus
- Four DIMM sockets support up to 2GB Registered DDR266
- One AGP 4x slot and five 32-bit PCI slots
- Gigabit Ethernet and Fast Ethernet LAN options
- Promise® ATA-133 IDE RAID option
- AC'97 6-channel audio option
- ATX12V power; ATX form factor

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VIC : (03) 9560-7222

Rectron Electronics
VIC : (03) 9561-6166

For more information on Tyan products, visit our corporate web site at www.tyan.com

The Heavy Water Project: Phase 1 of 4

It begins. Witness the birth of the Atomic Heavy Water box from Hell. Ron Prouse, tech engineer xxxtreme embarks on an epic voyage of Atomic tutorialism.

The end result of this four part tutorial will be a bitchin' bad-arse watercooled and perfectly formed *objet de tech*. Take inspiration from the bits that interest you and have a tool around with your own box, or follow us completely, and month by month build up the ultimate hot box.

When we're done and we've built the most desirable PC in town, we're going to do the only natural thing: we're giving it away. Look inside for the competition details, and imagine, as the project develops, that one day it could be yours.

Are case-modders mere show-offs who bask in the reflected limelight of the Cold Cathode tubes crammed into their boxes at LAN/leeching parties?

Or is case-modding simply an extension of ourselves, our computer-driven lifestyle and our self-image? If you are still asking the question, 'But why?' then you probably have the same thoughts about modified cars. Why would anyone want to have a car with wide-wheels, a body kit and a 100mm diameter exhaust pipe?

Why would you buy a Zebra-skin cover for your mobile 'phone. . . or, worst of all, use those monogrammed hankies Grandma gave you for Christmas? Why? It's about your possessions reflecting your personality, that's all.

Of course, we're also interested in finding the balance between functionality and 'flash', so this four-part series will illustrate that some case-mods have been based on necessity, and serve a valid purpose. Take system cooling: as CPU and graphics card clock-speeds are pushed ever higher, hard drive spindle speeds increased, and lightning-fast CD burners become commonplace, the humble computer has suddenly become an effective heater. This heat has to be somehow dissipated before all that expensive shiny silicon turns into black crunchy stuff.

Not only are the faster components generating more heat, but now we have lot of them – multiple hard-drives and DVD/CDRWs – jammed into the same space reducing the amount of air volume available for cooling. While the 'active' components inside our computers have been the subject of rapid technological evolution, the average generic computer case has been sorely overlooked.

Until recently.

Blow it

How do we increase the thermal efficiency of a boring, beige box? The most logical solution is to place additional ventilation fans in strategic positions around the case, circulating fresh air at a rate that will overcome excess heat build-up. Good air circulation inside a computer is the most cost-effective way of helping to prolong the life of expensive system components. Keeping the ambient case temperature down five or six degrees will not only help that expensive new graphics card work at its maximum performance level, it will also help it last a lot longer.

The first step is to consider where the heat is being generated, and how best to extract it. A computer case will usually depend on the fans inside the power supply to do this, although some will have another 'exhaust' fitted at the back. As the fans extract air, the resultant low pressure causes air to be sucked in through whatever gaps there are. Not exactly a controlled flow, but better than nothing. The ideal situation is a 'wind tunnel' effect where an equal amount of air enters and exits the case by travelling a path that covers all the 'hot spots'.

In a textbook scenario, the ideal air-path would be from bottom-front (hard drives), over the motherboard (graphics card and processor), and exiting out at the top-rear (power supply). This scenario also applies that well-known Law of Science, that 'hot air rises'.

When you have chosen the suitable location for your additional fans there are a couple of other decisions that have to be made, including choosing the physical size of the fan and its potential airflow.

Part of the choice on fan size might be made for you by the limited available space in the box, so you'll need to scope the location carefully as it will also have a major impact on just how effective the cooling solution will be. Common fan sizes are 80mm, 92mm and 120mm square, and usually 30mm deep.

As a rough rule of thumb, larger fans will move more air, and do it quieter than a smaller unit. The capability of a fan is measured by its ability to move air by 'cubic feet per minute' (CFM). The noise output is measured in decibels (dB). Most specialist fan companies will detail the CFM and dB levels of their products as part of their specification lists, as these details are important when choosing a purchase. Start at a good shopping site such as PC Case Gear (www.pccasegear.com.au) where you'll find detailed specifications of all of the products sold by the company.

You'll also need to think about whether you want your fans 'tailed' (with a push-fit connector) or 'un-tailed' (bare wires) – for the sake of this project I am using tailed fans, with pass-through Molex fittings. You can always cut the connectors off later on!

If you feel that you need more information about any of the above, then head to the online home of the Guru of All Tech Information, Dan Rutter over at (www.dansdata.com).

PSU Tech-Tip.

Now you have installed your new fans, and maybe even built a fanbus to power and control them, you want to try them out, right? A good idea when working on any electrical modification is to check that it is going to work correctly on its own, before mixing it in with your sensitive computer components. If there is a problem with the wiring inside your new FanBus, or a dead-short (circuit) in a fan connector, it is best to find out and rectify it before you re-assemble everything. It also makes it easy to pinpoint the problem, too. The thing is, since you took all of the hardware out of your computer case, the power supply unit (PSU) won't switch on any more.

Why? If you have an ATX PSU – and I would be surprised if you didn't! – then the on / off switching is actually controlled by your motherboard. When you pulled the ATX plug (the white one) out of your board, you also removed this remote switch capability.

There is a way to turn your PSU on without having to re-assemble everything and all you need is a short piece of spare wire! If you look at the ATX plug in the picture, you will see that there is one green wire, at terminal four on the top side of the plug. Next to that is a black wire at the third terminal. Strip back a few millimetres of the insulation on that spare piece of wire and use it as a bridge, or jumper, to connect these two terminals – now you have power to the Molex connectors without having to fire-up your motherboard. You can also use this technique to control a second PSU if you decide that you will need more power than you have at present. Let me explain: there is a belief that loading up the PSU with extra fans or case lighting can cause instability on the crucial 5V rail (the power line that your motherboard uses to function). Under normal circumstances, the average PSU 12V supply is more than adequate, however, if you have decided that your case airflow will rival a Harrier Jump Jet, you may be asking for more grunt than your generic 250Watt PSU can deliver. The expensive way to overcome this is to calculate just how much power you will need, and then buy a high-output PSU that will cope. The other way is to run a cheap, secondary PSU, dedicated just to powering the 'accessories'. Of course, you'll need the room in your case! If you want to remotely control the second PSU, simply splice the black and green wires mentioned above into the same wires on the main PSU ATX lead, and then both PSUs will be controlled by the normal power switch.

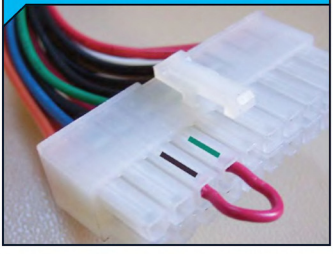
You know you want me!

And you can have me. All of me. To take home and play with and keep and love forever. Well, one of you can. If you're very lucky indeed, because I'm up for grabs at the end of four months of reconstructive surgery. Woot.

To be in the random draw to win, you'll need to answer four questions correctly (one each month), starting now – and don't forget to use the same name each time you enter.

Email your entry, one per person, to win@atomicmpc.com.au, with the heading 'Heavy Water part 1'.

Q: What was the name of the WWII movie about the Allies' sabotage of the German nuclear weapons project?



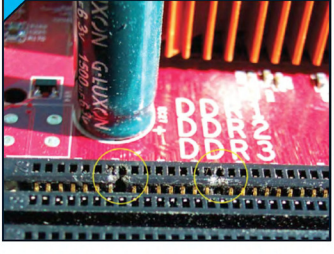
ACHTUNG BABY!

There are a few basic things I want to mention up front:

- Remove all of your hardware from your computer case before you start any case mods. Yes, all of it. You are going to be cutting, grinding and sanding metal, and just one metal filing across two PCB tracks can destroy the lot.

The picture below used to be a $300 MSI mobo that now isn't! Never say that you weren't warned!

- Always wear safety glasses when grinding or cutting. The 'One-Eyed LAN Clan' is a sad act indeed.
- If you aren't sure of how to do something, practise on something disposable first.



How much air is enough?

There is no hard and fast rule as to how many times a minute that the air inside a computer should be refreshed – there are variables that will differ in every situation – but 20 times per minute is a supposed minimum benchmark in a standard system.

There are at least three schools of thought regarding case ventilation methods, and each has its hardcore supporters – so let's start a fight.

School 1: Positive pressure – pushing air into the case faster than it can be expelled. Supposedly this technique helps keep dust out of the case. Right... so what about the dust that is in the air?

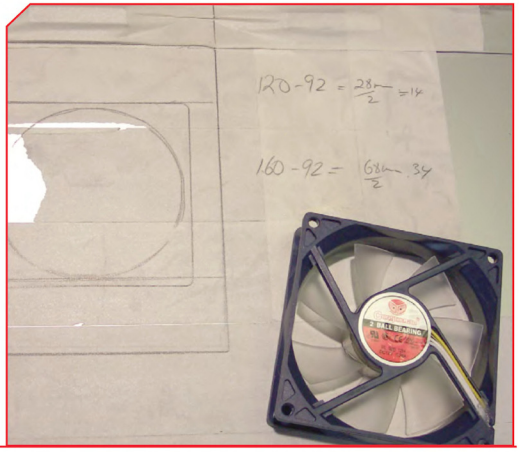
School 2: Negative pressure – works on the theory that nature abhors a vacuum, and will move Heaven and Earth to fill it with something, preferably air. Too much pressure negativity and your case will cave-in, especially if it is made of Aluminium.

School 3: Cross ventilation – or the 'wind tunnel effect'. This technique uses balanced amounts of intake and exhaust volume to keep the cool stuff coming in, and the hot stuff going out. I will make my stand by stating that this is my choice. There is also the case-size factor: a large case will have more air-space to begin with, and therefore the refresh rate can be lower than a small case with the same components inside. Follow the logic? So the first step is to get some idea how much airspace there is inside your computer.

You can calculate the volume of your case by multiplying the height by width by length, so a cubic foot is 30cm x 30cm x 30cm = 27,000 cubic centimetres, or 27 litres. If a midi-tower is 45cm x 20cm x 49cm then the volume is 44,100 cubic centimetres, or 44.1 litres. Now, if approximately a third of that area is taken up by components, the actual free space would be about 30 litres, or one cubic foot. To refresh this much air in a minute will take much more than a single 1CFM fan though, as air drag and other obstructions come into play. If the air has to be 'sucked' in through small gaps in the case you're making your system suffer a similar fate as marathon runner forced to run the entire race while breathing through a straw!

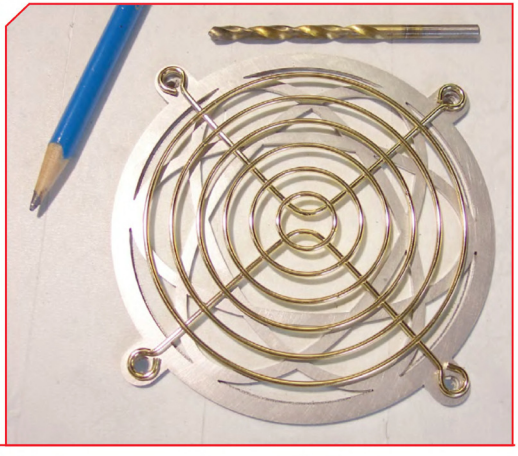
Anecdotally, an efficient fan will operate at 20% of its rated capability, so a single 1CFM refresh would take a 5CFM fan. Multiply that by the suggested refresh rate of 20 times a minute and you need an airflow of 100CFM. Two 50CFM fans in a 'push – pull' configuration should almost cover it.

Fitting the Fans:



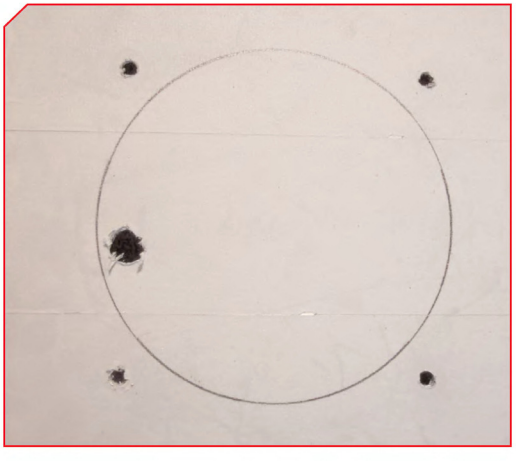
1 The first step is to measure everything up and make sure there is room to fit the fans where you want them. Twice! Be conscious of where everything else goes when it is fitted back in the case, so that the fan won't obstruct other components. I know someone who fitted a top blowhole and then couldn't fit his PSU (power supply) back in. . . on a Lian Li PC-60. Ouch!

Here's a tech tip: use masking tape to cover the edges of all of the area you intend on cutting, because tape is easier to drawn on, and it should protect the rest of the case from chips and scratches. This first step is an important one that you'd be best not to disregard, because the effort that you put in now with a setsquare and pencil to line-up and draw on the case will really shine through in the final look.



2 Once you have marked everything out, use a nail to scratch in the positions for the four mounting holes. Why a nail? It is one of the few pointy things I have found that will fit through the fan mounts! Centre-punch the hole positions first to stop the drill sliding all over the place, and drill the four holes with an 11/64" drill. Screw the fan grill into place, as it is going to be the template for the size and shape of the hole. Did you say, 'What fan grill?'

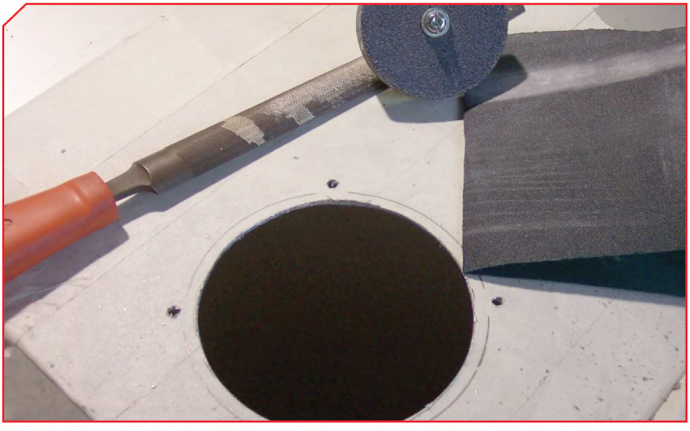
Protective grills are a must for any exposed fan, so either make sure that one is supplied, or purchase one separately. Now, here is a thought: you can either use an ordinary 'wire' grill, like the gold one pictured here, or spend a few extra dollars and get a stainless-steel laser cut one. The laser-cut grills not only look cool –they are much easier to install. The wire grills don't allow for any error when you are cutting the hole out, and if your hole isn't perfectly round (stop sniggering) then the wire grill will actually accentuate it. The laser cut grills, on the other hand, sit flush on the surface of the case, and have a 3-4mm wide outer surround that will hide your sins!



3 Draw around the inside of the outer ring of the fan grill with a pencil, keeping as close as you can. Make sure that the pencil is at right angles to the case at all times, and you should end up with a perfect circle. Remove the grill and you are ready to start cutting.

This is the most important step of the exercise: whatever shape you start off with is ultimately the shape you are going to get - give or take! If the outline is egg-shaped to start with, then things will only get worse. Another thing: the thinner the line the less you are likely to wander – if possible, use one of those 0.5mm mechanical pencils. (I had to use something thicker so that it would show up in the pic. . .)

If this is your first case mod, or if you are working on an expensive case that doesn't allow for mistakes, then my suggestion is that you aim to cut the hole about 1mm smaller in diameter than it actually needs to be. Then you can simply remove that last little bit with a fine file or coarse sandpaper, which is much safer than cutting too much. There is an old saying that goes something like, 'You can always remove a little bit more, but it's bloody hard to put it back!'

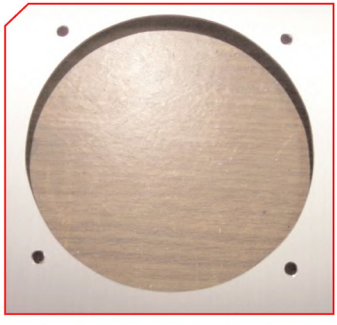


4 There are heaps of different ways to make holes in sheet metal. My favourite is a fine-blade (24 teeth per inch) jigsaw, but you can use something as simple as a bare hacksaw blade, or as hi-tech as a Dremel. If you use a jigsaw you'll start by drilling a hole to get the blade in and then simply following the line – one tip, stay on the line, not alternating between both sides! Remember that you're cutting a circle, so constantly turn the blade.

5 The 'Holey' Trinity: The File, The Grinder and The 800Grit. These are the tools that will give you the ultimate finish that you are looking for. The file is used to remove all of the burrs.

Use the grinding disc with a power-drill (on a low speed) to round out any 'flats' in the circle: the trick here is to get a disc that is as close to the size of the hole as possible to help stop everything going pear-shaped!

Once the hole is as close to perfect as you can get it, use the sandpaper to achieve a smooth edge all the way around. Remove the masking tape, and be astounded at you handiwork. Wipe the area over with a window-cleaning solution to remove any of the remaining tape-adhesive and to clean off the metal dust. You should now have a perfectly smooth, and perfectly rounded hole.



6 Time to get out the nail-polish. Wow, that got your attention!
If you are cutting up an Aluminium case then you are ready to bolt it all together, but on a steel case there is one more issue to address: rust. Even inside your hermetically sealed domain, bare metal is going to oxidise eventually, so the best way to avoid this happening later is to seal it now. Unless you have a tin of 'Computer Rat-Beige' paint handy, the best solution is a coat of clear acrylic, and an acrylic like nail-polish even comes with its own application brush. Handy.

7 The final assembly. You will have noticed two arrows engraved on the side of the fan, showing the direction of rotation and the airflow. Make sure that the direction is the way you planned and screw it all together. If you have followed this through, then the finished article should look as if it was supposed to be there, without the need to repaint the case. The secret is to take your time with each step, and make sure you use the masking tape to protect the rest of the case from the inevitable 'slips' that will occur. If you have had a bit of an incident that wasn't saved by the tape, don't despair. 'Modding-friendly' computer shops sell black rubber edging that you can stick around the inside edge of your blowhole to cover those unfortunate blemishes within a reasonable distance of the edge of the hole. If the scratch is long and really obvious, your best bet is to go down to your local auto accessory shop and look for a tube of matching touch-up paint, or add a heap more scratches and call it 'Art'. . .

If you do have a major 'slip' while cutting out the hole, don't panic and make it worse ... head back to the shop and buy the next size larger fan, and start again!

Another way out of a spot is to get a piece of thin sheet metal, 25mm larger all-round than the fan hole, fit the fan in the centre of it and then rivet it to the case. Sure, it might look a little 'odd', but it can even be made to look like a feature, with a bit of artistic shaping - or make it out of aluminium and polish it to a mirror shine! Remember, this is about having fun and being different. Repeat after me: 'Atomicans never fail, we just have the opportunity to do it again.'

The Fan Bus:

It's one thing to install a few extra fans, but what about getting power to them? If you bought fans with 'pass through' wiring, then all you need to do is join them in line with any Molex connector that is close by. But what if there isn't a handy connector, or if you have used 'un-tailed' fans? What we need is something like a domestic power-board (the kind you use to plug 72 separate devices into one outlet) – and the computer-version of a power-board is called a FanBus. I'm not sure why.

Regardless of its name, let's make one and add some extra fan control at the same time. I'll explain that comment when we get to the wiring.

The components used are:

- A small, clear plastic project box (Jaycar # HB-6005)
- Plastic audio speaker terminal (Jaycar # PT-3000)
- Terminal strip (Jaycar # HM-3194)
- Molex plug 'pass through' power splitter (Dick Smith # no id)
- 2 x 3.5 mm mono audio plugs (Jaycar # PP-0116 / PS-0122)
- 12V 3Amp auto-reset circuit breaker (Jaycar # SF-2283)
- 3mm nylon screws and nuts (Jaycar # HO-0142 / HO-0146)
- Heat-shrink – for any exposed solder joints. Use it!

Optional extras:

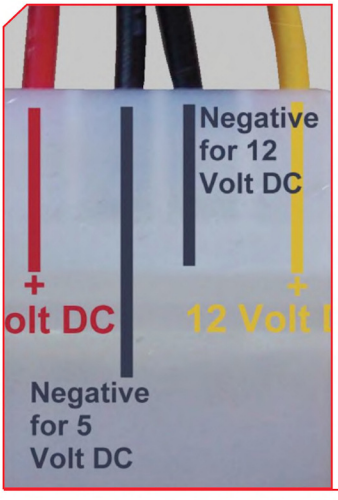
- 2 x 5mm High Bright red flashing LEDs (Dick Smith # Z-4044)
- 2 x 5mm LED Bezels (Dick Smith # H-1934)

A quick explanation of the functions of the two connector types. The 3.5mm jacks are for the 'hardwired' components, such as side-fans mounted to the case-cover. They would normally be connected, but you need to be able to unplug the fan to remove the cover. The spring connectors are used for more of the 'switch and swap' items, like a fan that only gets used for extreme LANing, or dispersing mid-Summer heat.

Under no circumstance should any of the 'system critical' fans (that being the CPU or graphics card HSF, etc.) be connected to the FanBus.

1 The first step is to scribe the profile of the Molex connector at one end of the box so that when the plastic is removed the hole will be a 'neat' fit. The Molex connector has a plastic tab that will stop it from sliding through. To cut out the hole, drill a series of perforations just inside the scriber line, break out the plastic and then file to remove the rest.

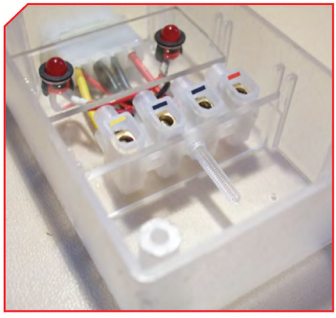
2 Once the hole has been shaped, and the Molex connector is a snug fit, the next step is to fix it in place with a strong plastic glue. I have found that Selleys' two-pack epoxy gives the best results. Make sure to get some of the glue around the 'shoulder' on the plug. It dries clear, so the overflow isn't noticeable, and it will provide extra strength.



3 This is a good time to explain the wiring of a Molex plug. As you will have noticed: one yellow, one red, and two black wires. If you are used to working on car electrics then repeat this next sentence out loud: 'The yellow wire and the black one next to it are the 12 volt pair.' The red and adjacent black are the 5 volt supply. Computer fans are usually 12 volt, and so in a FanBus the 5 volt pair are superfluous, right? Wrong!

There is a neat trick that you can use to power a fan at approximately 60% of its normal speed and drop the noise level considerably. Power it at 7 volts. Here's how: the potential voltage is determined by the difference between the voltage of the positive and the negative supply; so if you use the normal 12 positive, with the 5 volt as the negative, then the result is 12V – 5V = 7V.

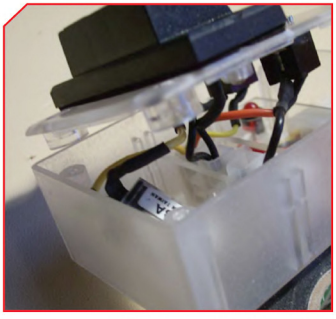
4 This is an optional part of the project... flashing red lights! Cut a square piece of clear plastic – get some sheet off-cuts from a plastics retailer – so that it fits into the horizontal PCB guides in the project box. Drill out two holes, and fit the LED bezels and LEDs. Because the Molex connector I am using is a power-splitter, it already has two spare wires running from the 12 volt rail, and as the LEDs specified above are 3-15 volt compatible, there is no need for external resistors. All you need to do is connect the long 'leg' (anode) of the LED to the positive (yellow) wire and the short 'leg' (cathode) to the negative (black) wire next to the yellow.



5 The next step is to mount a '4-gang' section of the terminal strip to another plastic off-cut, sized so that it fits into the vertical PCB slot, and secure it with a nylon (non conductive) screw and nut .

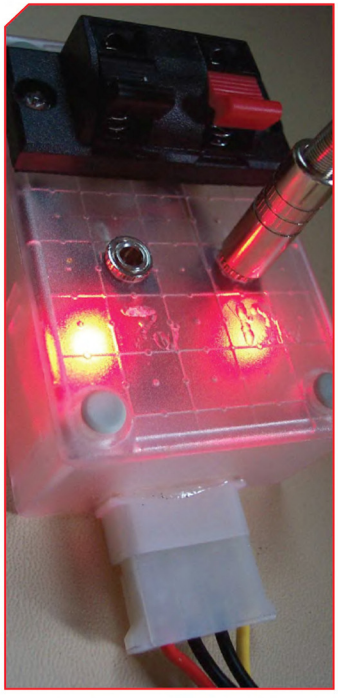
Strip 4mm of the insulation from the Molex wires, and run them into the bottom of each of their respective terminals. This method is not only neat, but it will simplify the internal wiring and minimise the possibility of short circuits.

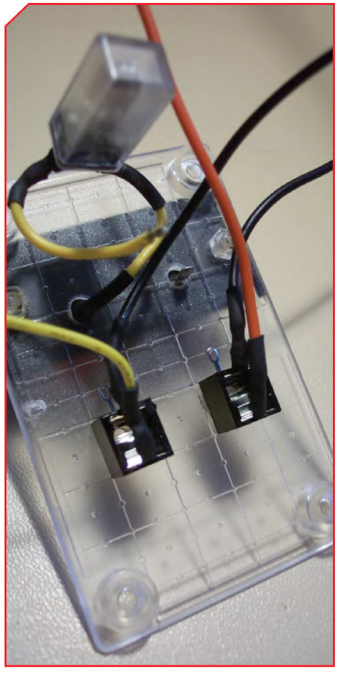
After learning the hard way, I'm totally obsessed with insulating everything properly. It might take you longer, but will save you trouble in the long run.



6 The final wiring-up is fiddly, but try to keep the wires as short as possible, as jamming two metres of wire into a small box is a recipe for disaster! A good practice is to 'twist and tin' (apply solder) all of the wires that are going into the screw terminals.

By doing this you won't have stray strands of wire arcing across to the other terminals, or the ultimate frustration of wires slipping out of the connector just as you get the lid in place! Make sure that you don't 'mismatch' the pairs: each black wire must be paired with the coloured wire closest to it.





7 At this point you have to decide on the layout for your connections, so take time to choose a layout that gives maximum flexibility for your application. The positioning that I used will have the spring connectors closest to the back of the case. If you have a multitude of components that you want to power via the FanBus – or if they are at opposing ends of the case - you're better off not trying to have everything connected into the one box. Instead, build two: a 'master', and a 'slave' powered by the first! After checking for inside clearance, drill the holes to mount the components to the lid.

You also need to decide on the supply voltage to each connector – I'm going for 12V to the spring connectors and one 3.5mm audio jack, and 7V to the other 3.5mm plug. I have also installed the circuit breaker into the 12V lead that goes to the spring connector, a matter of in-one-side (marked 'line'), and out the other (marked 'load'). Why on the spring connector only? The chances of shorting wires on the enclosed 3.5mm plugs is minimal, but very possible on the exposed spring connectors. Note that every exposed joint is heat-shrink insulated.

8 Notice that I have engraved the relevant supply voltages onto the lid of the FanBus to save confusion later!

The best thing about this project is that it is an integrated unit. Simply plug in a PSU header, or BayBus control lead, and it is ready to go. 'What is a BayBus control lead?' I hear you ask, well, put simply, a BayBus is a remote switching device, usually fitted into a drive bay on the front of the computer, which controls the power going to the FanBus. A tutorial covering this will be in the next issue.

Now, one final warning: do not reassemble your computer, wire everything up, plug in your FanBus and hit the power switch – because that would be as crazy as pointing the barrel of a gun at your foot and pulling the trigger to see if it is loaded! There is a small section included in this article that explains how to hot-wire your power supply unit (PSU). To check that you have wired everything correctly, install the fans, FanBus and PSU, and connect them up. Then hit the switch.

If everything whirs into life, power off and install all of your other components. If nothing happens, then it's time to search for the problem.

HOUSE MODDING

Andy 'Muinztar' Mullett gives you the low-down on professional looking cable installation in your home.

It's three in the morning, it's been a hard slog of fragging mayhem and you're tired. It's still dark and the sound of meat slopping on the floor still echoes around your head. You stumble over a cable loosely running from your room to your opponent's, tearing your computers both to pieces and sending yourself headlong down the stairs. . .

Cabling spread haphazardly around the house is impractical and problematic at best. A lot of people don't have stairs either, but that's beside the point.

Go wireless you say? Wireless networking is expensive. Wireless networking is slow. Near-cable speed wireless networking is hideously expensive. Although these factors will change at some point in the future, what about the question of privacy?

Sure, wireless encryption protocol (WEP) or its counterparts will get better, but there will always be people with the tools and skilz to break the encryption.

Layout and design

An important question arises whenever you decide to make modifications to the building you call home. Particularly, you need to be sure that you have permission from those in possession of ownership rights to the building. This may be your parents, housemates or the snaky landlord who visits frequently to inspect the length of skids inside the porcelain throne.

On the flipside, adding network infrastructure can add value to the property; so there's some hope left if your landlord is the kind that would oppose driving a nail into the wall for hanging pictures or AMD promotional posters.

A word of warning

Any task that involves hacking into the walls of your building poses a risk of electrocution if you do not observe proper safety tactics. If you intend to place your outlets near existing power points, you would be well advised to exercise extreme caution when attempting to cut or drill into the wall cavity.

Some electricians leave excess power cable behind the outlets, which your drill will quite happily eat into if you are not careful. Afro hairstyles generally went out with the 70s, and proximity to power points may result in undesirable interference with your network point.

Another point to consider is that power circuitry generally runs vertically either up or down (depending on your building type) from the outlet. So don't go drilling above or below these things either, unless you like the thought of overclocking your heart. If there's *any* doubt, it's highly advisable to consult a licensed electrician before undertaking any wall mods.

OK I'm allowed to chop it up?

Before you start hacking away at your beloved abode's walls, you will need to draw up some kind of working diagram. It would be advisable to go for a romp around your place armed with a tape measure and a notepad. Take into account the height of walls and the various obstructions likely to impede your cable placement. It's preferable to place these cables out of the way of other access points, such as the manhole cover (for roof space cable runs) or copper pipes and any other kinds of plumbing. Take some time to locate the wall internals. This is easily achieved using your advanced sonar skilz. By tapping the wall with your finger, you can find the studs and noggins easily. When you hear a dull sound, you know you've found an internal. If you prefer, you can purchase a stud detector.

Another important consideration involves proximity to electrical wiring. Any cable carrying a large amount of current, at a reasonably high voltage (relative to network traffic) can generate an electromagnetic field of sufficient strength to disrupt communications through the line. It's quite easy to avoid EM interference without going to the expense of shielded twisted-pair (STP) cabling. By simply ensuring that your cat-5 cables are not running parallel with 240V circuitry for any more than 50 cm, interference will be trivial.

Once you have completed surveying your kingdom, it's imperative that you sketch out your plan. Mark any places where you wish to place network outlets, which would generally include bedrooms and the lounge room. If you have an outdoor patio or balcony, consider placing an outlet there as well, so that you can have your MP3 box stationed in conjunction with a stereo for entertaining guests. If you have access to a floor plan, the planning task will be much simpler, as you will have all the rooms, doors and other objects to scale. Just remember to include vertical lengths in your planning, as nothing is more annoying than crawling around in the roof space or under the floor with a cable that's not quite long enough. You should always allow a further 10 % for an error buffer zone. Not only can you simply cut the excess later, but you can always hide the surplus within the wall cavity.

You will need to assign some point within the house to be the main connection point. This is the place where you'll keep your hub/switch/router and server (if applicable). Optimally, this would be at some central place in the building, although this is rarely practical. The main reason for doing this is to minimise the lengths of cable needed to access all desired outlets.

Depending on the type of building you may have to attack your walls from above or from below. Houses that are built on a solid concrete slab will invariably favour the 'from above' route, while those built on a raised floor can be assaulted from underneath. If your house belongs to the former category, the lowest you can expect your outlets to be is somewhere around the middle of the wall's vertical span. This is because the 'noggins' that pass between the studs will prevent you from placing cable between, unless you have a very long drill bit and a hobby as a 'boat in a bottle' builder. Although this is typical for most buildings, you may get lucky and find that some spans are without noggins. If this is the case, then you're quite able to drop the cable down to whatever height appeases your taste.

What you'll need

Tools of the trade

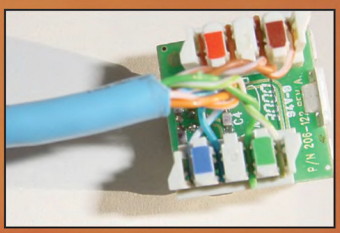
- You are going to need a plaster cutter. Your standard steak knife with a serrated edge (free!) will make light work of the wall. Just remember to clean the knife before you dig into a big sirloin.
- Wire cutters are a must for any kind of work involving electrical wiring, so you'll need these.
- A cordless drill will also be needed for putting your bare cables through the wall cavities, and for starting your cut where the outlet will reside. You'll find this useful when you're crawling around in a tight roof/floor space.
- You should also include a snake and a coathanger in your inventory, since you'll need it to fetch cables within the wall cavity. A snake can also save you from frustration when poking wires through a tight junction. A snake is a hard length of plastic or wire that you can easily push through a small hole or around a tight bend, which you then use to pull the desired cable.

The only specialised tool you'll require is a punch down tool. The plug fittings that you are going to connect to the cables have a special type of clip that bites through the plastic insulation and makes contact with the wires inside. What makes these cool is that you won't need to strip and solder wires into place, however they are prone to slipping out on occasion and therefore need to be handled carefully. For a professional spring mounted punch down tool (krone), you can expect to pay around eighty to a hundred dollars, although a disposable plastic alternative can be found for less than ten razoos and does a fine job. Do not use a blade screwdriver for this task! It will damage the mechanism that bites into the wire.

Lastly, you will need a tube of filler, such as silicone, No More Gaps or some form of sticky shit, to seal up areas around holes that your cables will run through.

Plates, plugz and wire

For this tutorial, I am using *Clipsal* wall plates (e.g. 2032VH), which are available with different



amounts of standard plug-in sockets. For most outlets you will want the single-socket variety, as these will only need to accept a single input. For your common point where you intend to place the hub(s)/server you should opt for a plate with several sockets (up to six) as all your other connections will route back to this. You will most likely want to have several redundant connections, in case you decide to install more connection points later on. Connection points are made through the use of terminal blocks. These plugs cost around nine dollars each, and simply snap into place within the socket. I am using *Clipsal* (568A) blocks, which were chosen for their push in type connectors on the back, making installation a much simpler task.

Cat-5 cable is an obvious requirement, as you won't be hooking much up without it. Cat-5 can be bought in bulk for as low as 50c/m, and generally comes in rolls of 300m, but you can purchase shorter lengths. Remember to purchase at least 10% more than you plan to use.

Of course, you're going to need several standard network cables as well. We will only be creating access points, into which you plug your cables. You will not need crossover cables, as we are essentially creating a permanent extension cable leading to a stationary hub. However, if you intend to link two or more hubs, then crossover cables may be needed between them, but always make your wall plugs the straight-through variety. For each access point, you will need at least 1m-length cables that will plug from the wall to the hub. On the other end, you need a cable of practically any length that will reach from the wall to the computer, preferably without creating a trip-wire.

Construction

Time for the fun part. Now you've planned out all your points and cable runs, start fragging some plaster. Using a pencil, sketch a rough rectangular area large enough to accommodate the back end of the wall plug (around 5-7 cm ´ 3-5 cm). This hole does not need to be very large, so don't make an outline of the whole wall plate. Drill a small starter hole at the corner of your desired outlet. Using your knife or plaster cutter, chop out this section and press your wall plate (with connector clipped in) to check if there's enough clearance. If not, cut a little more out and repeat until a nice fit is made. Repeat this for all wall plates that you plan to install.

Measure out the distance from your freshly cut holes to a corner or some kind of reference point, since you can see the walls from either their base plate or top plate when the time comes to crawl around. You'll use these measurements later as a guide for finding the appropriate site to drill into the wall. If you're doing this from underneath, safety glasses are a must. Head into the crawl space, locate the appropriate section and drill a small hole wide enough to fit your cable. Push an ample length into this new hole and if possible, try to make it loop a little so that it will be easier to snag with the good old coathanger. If this point is intended to be your common access point, then you may wish to use a larger bit, or a spade bit that will create a wider hole, as you are going to have several cables running into the common point. Mark each access point with a felt-tip marker. You can remove this later with some methylated spirits, but it will be helpful when it's time to test.

Back inside the house, cut your coathanger and use the hook to fish around for the cable. This requires some patience, but you'll eventually hook it and you can then pull it through to connect your plug. Now that you've done one cut, proceed to the rest so that you end up with several cables hanging out of the walls at various locations around the house. We will attach these plates firmly to the wall later, once all the wiring is complete and tested.

Hooking the up da plugz

To attach the plug points to your cables you simply cut the cable about 1-2 cm from the end. Take a pair of wire strippers and *carefully* strip the outer plastic layer, but do not strip the paired wires within. You will notice there are four pairs of colour-coded wire neatly twisted together. This twisting is *very* important, as it is responsible for proper transmission of data. With every junction, the wires are untwisted for a few centimetres, which can lead to lower quality connections if you don't observe this requirement – for this reason, you want to keep as much of the wire twisted as possible until they have to be split to connect to their respective contacts. Note the colouring on the back of your terminal block: you will see that only the four solid colours are labelled. With the *Clipsal* brand plug, the striped wires go into the slits above and below those for the solid coloured wires. Untwist a small portion of each pair, place it flat against the groove and push it gently with your punch tool. You will feel it click into place when the insulating plastic is cut by the clip. Attach all four pairs, even though typically only green and orange are used. Connect the appropriate socket at your common point, as you'll need one there for testing.

You can use your beloved hotbox as a testing tool. Proper network testing software (e.g. packet generator) is generally as expensive as its hardware counterpart, and since this is a relatively small installation, you can get away with a more simplified test. You'll need a computer on both ends too, so pretend you're taking your computer to a LAN for five minutes. Rig up both boxes, with a hub at your common point, and test your network. If you've only connected one point so far, you can place the hub alongside your computer for the time being.

To test your handiwork, first use a good old TCP/IP ping. You can check for proper connection by looking at the link light on either your network card or the hub. Remember that Windows takes a while to locate all the computers on the network, so instead of using Network neighbourhood, open a 'Start-run' box and type **\\computername\sharename** to access the other computer. If the line is totally dead, perhaps you have made a mistake with your labelling – often the cause of an unnecessary 'oh shit'. If it's still completely dead, you should re-examine your connection to each of the plugs and make sure that all four pairs are linked to the correct slits.

To test data transmission, simply create a huge .zip file somewhere around 300-400 MB, copy it across the network and then test the archive integrity. DivXes are supreme for this task. Should any CRC errors occur then check for any instances of possible interference from power circuitry or the good old TV antenna. A good idea would be to try connecting another cable that runs through a different area and re-test it there. If all goes well, then finish hooking up the remainder of the plugs. Attaching the wall plates is a simple affair, and can be done in several ways. The easiest way is to use some 'fan screws', which poke through and spread flat as you screw in the bolts. Just note that plaster cannot hold a screw on its own as it's quite brittle. Any method that holds the plates firmly will be ideal. Finally, use your sealant to plug any unwanted holes, and to plug spaces around the wires that you fed into the wall cavity.

Now your walls no longer look like Swiss cheese, and you have a neat permanent solution to the dreaded cable nightmare.

Free at last

Just imagine how fine your shelf of legitimately purchased games will look, with the addition of one or a few of the items we're giving away below. Of course, winning isn't guaranteed, but we will guarantee that you won't win if you don't enter. Logical.

Dungeon Siege

10 copies of game +10 Chris Taylor autographed shirts from Microsoft.

Critically acclaimed as being at least as good, if not better than Diablo, Dungeon Siege features see-through trees, a packed and stacked donkey plus several hundred thousand orcs to click on. If you win, you can play wearing a Dungeon Siege T-shirt, which has been autographed by legendary game designer Chris Taylor.

You'll probably lose the autograph if you try and wash the shirt, so we recommend that you spray the shirt with Scotchguard, so you can shake the crusty bits off when the caking gets thick.

Q: What is a Grue?

Global Operations

5 copies of the game from GameNation.

Go! Go! Go! Go! Go! Go! Go! Go! Go! Go! Go! Go! Go! In the future, soldiers -- spec ops in particular -- will be recruited from the Gamespy player lists. Assure your place in the army of the future and win a copy of Global Ops -- it's the new Counter-Strike, in case you haven't heard. Just like Op Flashpoint. So stress test that video subsystem while you hone those l337 Desert Eagle skilz.

Do it for your country, or whatever country meets your mercenary terms and conditions.

Q: Who was impersonated, and who did the impersonating, during the spectacular hostage rescue at Entebbe?

HOMM IV and M&M IX

5 copies EACH from Take 2 Interactive.

In long words, that's Heroes of Might and Magic IV plus Might and Magic IV. From 3DO, these two are the big guns of medieval fantasy monster slashing catacomb crawling spell-casting epics.

HOMMIV, in particular, is a personal favorite of the Atomic krew. Mostly, we dig that this is a game that forces players to listen to opera music for the duration. It's quite nice opera music that really ought to help stimulate a new interest in this catagory with the under-12 market, who have been conditioned to like only the Nazi marching music in C&C.

Q: Who was Smeagol's companion?

Serious Sam SE

5 copies of the game, plus t-shirt, poster and bag from Take 2 Interactive.

We're fully serious. In case you aren't familiar with Serious Sam SE, here's a special bonus Atomic mini-review: 'Serious Sam SE is quite probably the most thunderously wondrously funnestly toppy game ever created'. Can't go wrong with advice like that. Seriously though, this is the best game ever made. Probably will be the greatest game ever made, too. As we say around Atomic HQ: 'Yeah, but is it as great as Serious Sam SE?'

Q: What ancient structure was carefully raised to higher ground prior to the damming of the Nile?

Email entries to win@atomicmpc.com.au or post them to: Atomic, Competition Name, PO Box 275, Beaconsfield NSW 2014. The closing date for entries is 19 June 2002. Winners will be announced in Atomic 19.

Atomic 15 winners: Waitec Hip Hop MP3 CD: Q. Name the bandmembers of Grandmaster Flash and the Furious Five? A. Mr.Ness aka Scorpio, Kid Creole, Keith "Cowboy" Wiggins, Grandmaster Flash, Rahiem and Grandmaster Melle Mel. B.Banks, TAS. Autographed Tony Hawk 3: Q. What sort of company was K*Grind? A. At its peak K*Grind was an attempt at a youth-focused entertainment network purpose-built for broadband. It was structured to resemble an online pay television network and offered a series of channels, each focused on a specific niche community: surfing, skateboarding, snowboarding, rock, underground fashion, hip hop and so on. Kon-Artist, Mornington VIC; S. Salem, Melbourne VIC. Gigabyte Radeon 7500: Q. What was the name of the Soviet rocket destined for the USSR's failed moon landing? A. N-1. D.Mcauley, Cairns QLD. Dilithium AL3: Q. Which player pioneered the Aluminium cricket bat? A. The great Australian, Dennis Lillee, pioneered the Aluminium cricket bat. A. Kennington, Brisbane QLD.

Terms and Conditions of Entry. 1. The promoter is AJB Publishing Pty Ltd (ACN 083 063 914) of Unit 2-5/44-70 Rosehill Street, Redfern NSW 2016. Promotion period is from 9.00am on 15.05.02 until 12.00pm on 19.06.02. 2. Entry is open to residents of Australia and New Zealand. Management and employees of AJB Publishing Pty Ltd and their immediate families, and any advertising, marketing or promotional firms associated with this promotion are not eligible to enter. 3. Enter by posting or emailing forms to AJB Publishing Pty Ltd. 4. The draw will be held at the offices of AJB Publishing Pty Ltd at 5.00pm on 19.06.02. Winners will be notified by mail and published in Atomic 19. The prizes are not transferable or exchangeable. 6. The judges' decision is final and no correspondence will be entered into. 7. The promoter reserves the right to publish the winner's name and suburb for promotional purposes. 8. All entries will become the property of AJB Publishing Pty Ltd.

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AUSTRALIAN PC AUTHORITY

JUNE 2002 ISSUE 55

Breakthrough!

Mobile Pentium 4 technology finally makes desktop replacement a reality

READY TO MAKE A DVD? p40
DVD authoring hardware and software tested

LEARN TO DUAL BOOT p137
How to run two operating systems on one PC

UNDERSTAND 3D p141
Jargon-busting guide to 3D graphics

DOT BOMBS p102
How the rich got poor

ROBOTS A-Z p94
History and future of robotics

MINIDISC OR MP3? p46
What's best for your music?

DESIGNER TOOLS p54
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Golden POTM and LOTM this month can hook up and share in the glow of being Atomic winners, face to face from far away, because they each win a neat Swann VersaCam Webcam (www.swann.com.au).

LOTM: Once were friendless...

Amongst the many that love Atomic, there are us who have no friends in real life, we live at work, or school, or wherever else. We come home from people that shrug us off to the solitary existence that is our lives. We used to have no social life bar our families, if indeed we were in contact with them.

Then some of us started using IRC, and we developed strong bonds with the people we interacted with. Some of us would have serious depression problems if not for the social contact of Atomic and its forums and IRC channels. Some of us may even have taken on drugs or alcohol to solve our problems. . . but we have found out that someone always cares, is always willing to listen and help ya. We are very thankful.

Submitted and written by tH3_3rROR, from many people.

POTM: Click on this thread to troll against the system you hate!

www.atomicmpc.com.au/forum.asp?cat=gc&top=37826

Ug Lee managed to take an age old topic – console wars, give it all a long overdue bit of crazy clarity, then nail it again with his second post in the same thread. Top thread, top performance. Good one Ug Lee, keep on keeping on.

XDSL in rural Australia? You're kidding!

I want to comment on your article about xDSL. The writer claims that xDSL is the obvious 'alternative' 'for people in rural areas'. Is he one of those people who believe that rural areas are the western suburbs of Sydney or the foot hills of the Blue Mountains? Because he obviously has no idea!

I find the implication that xDSL (and I'll use the best quoted distance of 8.8 km from the exchange) is rural Australia's answer to broadband services to be absurd.

I live 16km from the local exchange and I am considered to live close to town, yet I have only recently managed to get connection speeds of 33.6Kb/s, thanks mainly to the magnificent Maestro Woomera modem.

Previously, on an extremely good day, I might get to 28.8Kb/s, but often a lot less, and remember that I am 'lucky' that I live so close to town (Coonabarabran) – my neighbours aren't as fortunate as I am.

It would be a miracle and a massive leap in bandwidth to get the 56Kb/s that my modem is capable of, but to read that xDSL is the answer 'for people in rural areas' is not only repugnant – it is fantasy!

Regards
Alan Wilkinson

XDSL author Ty Pendlebury replies: I agree with you!

Sure, a lot of people live in urban centres, and are quite close to an exchange, but DSL is not for everybody. There are obvious limitations for people such as yourself who live beyond the boundaries of this technology, and not necessarily in Woop Woop.

It's unfortunate, but it's a lot better than it used to be, and there ARE other, feasible alternatives to dialup such as satellite.

Three times the burning pleasure?

I remember reading some time last year an article you guys did on burners that would allow you to burn three times as much data to a CD-R. I had in my head a March 2002 release date for this technology which would result in burners costing very little extra but having this triple space capability. I can't find the article again but I was wondering what was going on? Will the burners be released soon? I have been holding off on buying a burner until the triple space thing becomes a reality. Is it still happening? Maybe you could do a mention in your mag sometime to update the situation.

Thanks,
Richard Kelly

We've been keeping in touch with TDK about this, as we're as excited, if not more so, as you guys about this tech. Due to unknown reasons, which are apparently not technical, the tech won't be released until the beginning of Q3 this year.

The novelty never wears off

Ever since my first experiences with computers as a seven year old with an Apple II+ in 1980 I've been interested in novel ways to use PCs. I also seem to have a bit of a fetish for drilling holes in the floor and running cable around the house! Currently I've managed to combine these two passions to good effect.

Being an avid movie buff I jumped at the chance a few years ago to add a DVD drive and a GeForce 256 card with TV-out to my PC, however my girlfriend wasn't too keen on having a computer sitting next to the TV in the living room (not sure why. . .). I've managed to solve the problem by making a nifty little set of RCA plugs mounted on a box on the skirting board in the study and the living room, with cable running under the floor.

Thanks to a great shareware program called TV tool (gets rid of the annoying black borders seen using TV-out with any vid card using a Chrontel or Brooktree encoder chip) DVD output on the TV really is pretty decent. Of course the computer also acts as a jukebox for all our MP3 files and DivX movies too. The next plan is to buy an IR remote mouse (very cheap on eBay) and convert it to a wired remote (easily done by removing the IR LED and soldering it to cable – once again run under the floor to the study) and use this from the living room so I can have full control of Media Player by remote. Not sure if anyone will find this useful but I'm certainly very happy with the results so far. Keep up the good work, great magazine!

Regards

Daniel Watson, NZ

Stop brainwashing my brother!

A plea to the people at Atomic: please, I write this to you as firstly a friendly gesture and with hope that you will pursue it: stop the brainwashing of my dear kid-brother. Since discovering your magazine he has somehow been transformed from a non-factual computer medium to a computer jargon-minded freak. I'll give you an example, he bought some cooling fan that your magazine once said was the best; however this fan drained the very sanity out of my entire family and I. It chirped and churned continuously like a rotten down printer from the '80s and he persisted that it was not making a noise. Months later he only changed it to another one, because of threats to harm his computer from my parents.

Another example of his insanity came as a result of the installation of ducted air-conditioning to my household. My brother (who I think goes by the screen name of Lion) rejoiced, not because we would be spared from the over powering heat of the Australian summer but so that his beloved computer would somehow become faster. This was illustrated when I stormed into his room and found an outward duct made from plastic bags connected from the vent to his computer.

When I plead to use the computer (only to check my email) he leaves it with the metal sides taken off – this he tells me is a 'cooling process'.

He spray-painted the case with silver-swirls – at first I thought he found a new love of art and that soon he would resist the computer whirl; instead he dumped Atomic magazines on me where I saw many, good but weird designs of the extremes people go to personalise their computers.

I have only high-lighted the extremes of my brother's deteriorating situation. If you do not act to help his poor state, then I only ask for a regular section located somewhere in the midst of your magazine providing tips on how to handle a deranged jargoned Atomic mind for the many parents and siblings of your Atomic readers who fear for their relations too.

With many pleas.

Rawan, sister of Lion (and probably on behalf of many who feel like I do)

Fair testing?

When you test two components, you make sure that everything is as equal as possible.

For instance, if you were testing a Celeron 1.3 and a Duron 1.3 back to back (*Atomic 15, page 44-45*) you would use motherboards from the same manufacturer, same memory, same video card etc. You are comparing just the processors to see the difference.

This test has no relevance, as you are biased towards the AMD.

Russell Farley

P.S. I was going to include a comparison of a Ford Ute (towing a caravan with half a tonne of bricks in the tray, like people normally use them) to a Holden Commodore (with two kids in the back seat and groceries in the boot, again, like people normally use them) to show the *obvious* (sic.) superiority of Holdens.

For the purpose of that article, we decided to test the CPUs in the motherboards that they were most likely going to be used in. Which just happens to be a zippy DDR SDRAM mobo for the Duron, and a slower SDRAM board for the Intel. Don't blame us that Intel was late to jump onboard the DDR boat :}

Free Windows XP beta?

A friend recently asked me if he could get a beta of Windows XP from me, when I inquired as to why he wanted one he said that he could run beta programs free. So in other words he could install a beta of Windows XP pay nothing and not be breaking the law. Is this true or is there something wrong with my friend?

Thanks

Ben

Commercial software, including operating systems and games, often undergo public beta tests. Windows XP did just that on a massive scale. Now that XP has been released the beta test has been terminated, or, if you prefer, the beta test has been extended to all the owners of XP. If you need a beta fix, try www.betanews.com.

Atomic's guide to programming your GPU

I have been reading PC mags on and off for ages now, only really using them for info to upgrade my PC. Then I stumbled onto Atomic and I don't buy anything else now. . . period!

I started many years ago with a very humble i386 with 1MB RAM and now run an AMD XP 1600 with 512MB – you get the idea. I am in the market now for a new GPU as I feel my GeForce2 MX400 is now slowing things down. So you can imagine my eagerness to delve into the article behind the headline 'GeForce4 & RADEON 8500 – unnatural graphics' (issue 15). Upon reading the article I was convinced that a GeForce 4 Ti (whatever) was the way to go, but I also loved the way the authors of the article explained certain aspects of how a GPU works which led me to write this email.

Would James Wang & John Gillooly ever consider writing a book on how to write graphics programs in DX? Or OpenGL with an emphasis on programming specific features of GPUs? The style of writing in the article seems easy to understand how things work.

You can call it 'Atomic's guide to programming your GPU'.

Just an idea,

Marc Steinlein, Victoria

What we think you need are NVIDIA or ATi whitepapers. GPU programming, which is not exactly the easiest of tasks, is probably not something one should consider as a hobby, nor is writing a book on the subject, unless you're an experienced coder.

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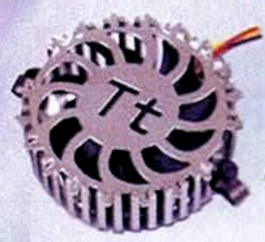

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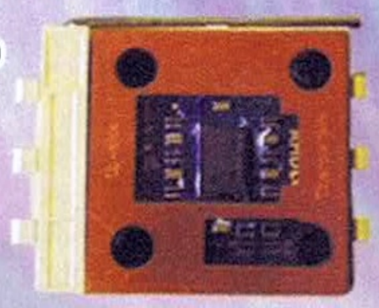

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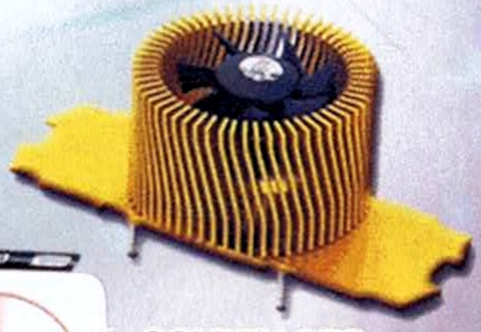

GOLDEN ORB SLOT1

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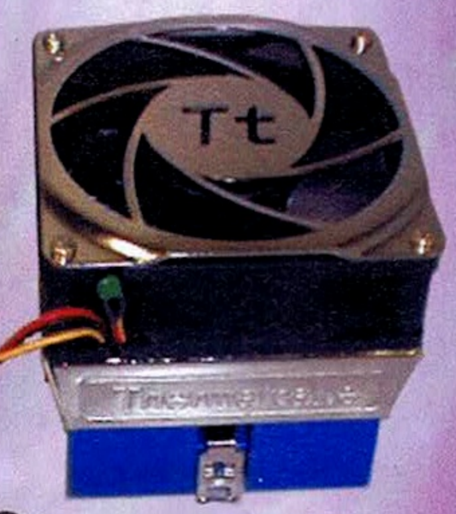
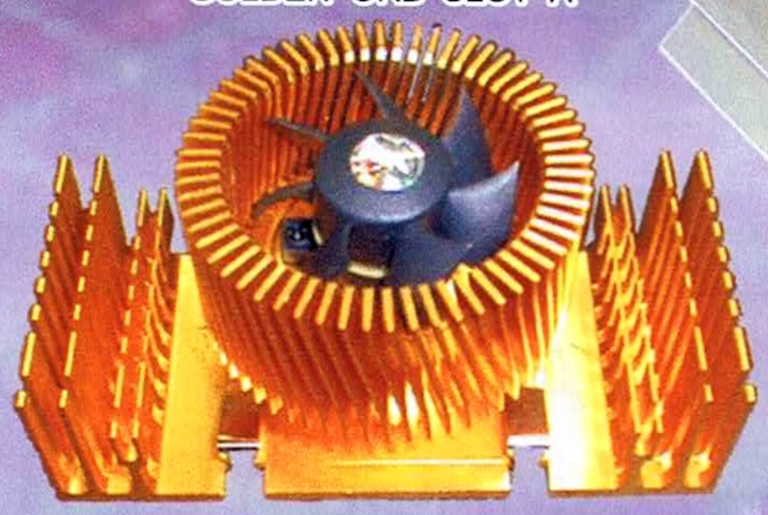


VOLCANO 7

DRAGON ORB

GOLDEN ORB SLOT A



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You may have the latest and fastest CPU and VGA cards. Do you have the best case to house all the greatest components? Aluminium cases dissipate heat 3 times faster than the traditional steel cases and when Lian Li builds it, your PC experience is guaranteed luxurious. Here are some comments:

apc *Australian Personal Computer*

"Lian Li cases are legendary among PC enthusiasts and case-modders, and are generally considered to be the Rolls Royce of aftermarket PC cases. Not only because they are comparatively expensive, but because their features and attention to detail warrant the price."

PC PowerPlay

"A stunner. All aluminium and built to withstand a direct nuclear strike in the megaton range. As we have mentioned more than once, we even dropped this case down a flight of concrete steps and it barely flinched. Ten bays keep everything snug, three extra fans keep it cool, and slide-off covers and a motherboard tray mean it's ready for upgrade action any time".

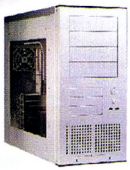
See detail reviews (search "lian Li") at

www.dansdata.com
www.overclockers.com.au
www.gamingin3d.com

All cases come without power supplies

Aluminium Tower Cases

PC-60USB
Silver full aluminium anodised
$390 RRP



PC-65USB
With transparent side panel
$475 RRP

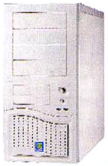
PC-12B
Powder coated external with full aluminium inside
$320 RRP

Common features
- Sliding tray for motherboard
- 2 front ball bearing fans with filter
- 1 rear ball bearing fan
- Selectable fan speed control
- Thumbscrew
- 490x210x450mm
  12 total bay 4x 5.25", 3x3.5", 5x3.5 Hidden

PC-70
Silver full aluminium anodised $539 RRP

PC-71
Black full aluminium anodised $559 RRP

- 2 front ball bearing fans with filter
- 2 rear ball bearing fan
- Selectable fan speed control
- Thumbscrew
- 210X595X588mm. Suitable for dual CPU M/B.
- 15 total bay



PC-5 Economic
Beige Colour powder coated
$199 RRP

PC-6 Economic
Silver colour powder coated
$199 RRP

- 2 front fans with filter
- 1 rear fan
- Selectable fan speed control
- Thumbscrew
- 490x210x450mm
- 12 total bay 4x 5.25", 3x3.5", 5x3.5 Hidden

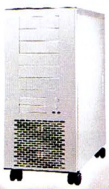
Aluminium Server Cases

PC-72SCA
Silver full aluminium anodised
- SCA-2 hot swap bays supports SCSI Ultra160
- SCA-2 backplane module
- 2x16cm ball bearing fans
- Selectable fan speed control
- Thumbscrew
- 589x209x574mm
- 13 total bays

$790 RRP

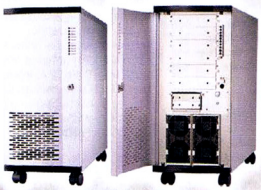
PC-626
Silver full aluminium anodised
270x665x498mm
- 14 total device bays
  4x5.25,3x3.5, 8x3.5 hidden for HDD
- 4 x 12cm two ball-bearing
  Suitable for dual CPU M/B
- On SCA version: SCA-2 Hot Swap bays, Support Ultra 160, SCA-2 backplane module

$1190 RRP, SCA $1390 RRP



PC-76
Silver full aluminium anodised
- 20 total bays 6x5.25,2x3.5, 12x3.5 hidden
- 6 ball-bearing cooling fan
- 265x559x630mm
- Suitable for dual CPU M/B

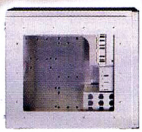
$990 RRP



PC-78
Silver full aluminium anodised
- 20 total device bays
  6x5.25,2x3.5,12x3.5 hidden for HDD
- 4x 8cm two ball-bearing fan
  2x 12cm two ball-bearing fan
- Suitable for dual CPU M/B
  (Max size: 12x13)

$1650 RRP

Case accessories



PANEL-65
Silver colour aluminium
Transparent side panel to suit PC-60USB $85 RRP

PANEL-75
Silver colour aluminium
Transparent side panel to suit PC-70USB $115 RRP

FE-525
Silver Aluminium Front Easy
Access all PC ports at the front of the PC $90 RRP

T-4 /T-4B
Dual thermometer
Silver /BlackMonitor CPU/MB/HDD temp
$59 RRP

MF-30HDD
Expansion mounting kit
Add 3 more HDD space to PC cases
$19 RRP

F-7 /C-2 /C-4/C-6
Aluminium bezels for FDD and popular CDROMs
CDROM/DVD models: Sony-CDU-5211, Pioneer DVD-116, TEAC-CD-540E
From $9.90 RRP

EX-12S
SCA-2 Module
SCA-2 Ultra-160 Hot swap module.
Takes 2x 5.25" bay space
$270 RRP

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42 Henderson Road (Off Laser Drive), Rowville, VIC 3178
TEL: **03-9763 8200** FAX: **03-9763 8400**

PERTH
Unit 2, 9 Leeway Court, Osborne Park, WA 6017
TEL: **08-9242 8588** FAX: **08-9242 8688**

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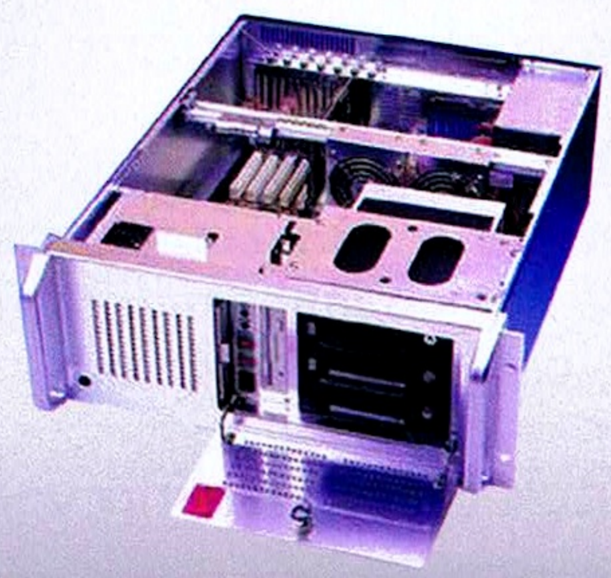
IPC-4032 4 U rack-mount aluminium chassis

Features include:

- Standard design 19" EIA
- Drive bracket: 5.25" x 3 + 3.5" x 2
- Heavy duty SPCC t: 1.2 aluminium construction
- Supports different versions of ATX, Baby-AT and Backplane motherboards
- One Al. re-enforcement bar for interface card stabilised with 2 x 8cm fan
- One 12cm cool fan & air filter in front
- Lockable front door
- Standard ATX 300W PS/2 power supply or hot-swappable redundant power supply optional
- Dimensions: 178mm(H) x 422mm(W) x 531mm(D)

From only $468 RRP



MSR-4620 all aluminium case (without power)

Features include:

- Tough die cast aluminium front panel
- Anodized aluminium alloy chassis
- Special conductive surface treatment
- Includes two 12cm side-panel fans and one 8cm rear fan
- Two additional front 8cm fan mountings
- Removable motherboard tray
- 12 drive bays
- Listed on Intel reseller centre Website
- Dimensions: 208mm(W) x 442mm(H) x 490mm(D)

Only $288 RRP

ATX4378 aluminium ATX case (without power)

Features include:

- Anodized aluminum alloy chassis
- Special heat conductive design
- Keeps system 8-16ºC cooler compared to steel
- Lightweight – only 3.6kg – half the weight of steel
- Corrosion and oxidation resistance
- Easy to remove thumb screws
- Dimensions: 200mm(W) x 411mm(H) x 445mm(D)

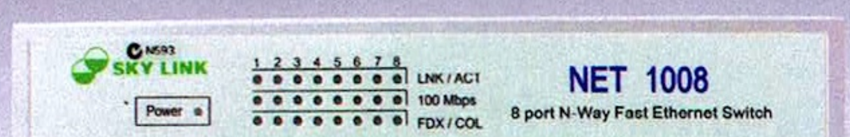
Only $168 RRP

NET – 1008 8-Port 10/100Mbps – N/Way Fast Ethernet Switch

Features include:

- Auto Negotiated flow control & Half/Full Duplex operations
- Broadcast storm control
- Rich Diagnostics LEDs
- Internal Power Supply
- Weight: 700g
- Limited Warranty: 1 year

From $99 RRP



For information and prices:

www.skyhawkgroup.com **(02) 9790 6647**

email: skyhawks@hotkey.net.au

Reseller / OEM / ODM / enquiries welcome

WARNING: This advert contains honesty

This site is NOT the Ultimate gaming site; it is NOT the biggest and it is NOT the cheapest (but it's close). There are no Flash media bits, no Fireworks. Hell, there isn't even a shopping cart right now.

Our company philosophy is simple: We want to help you get the best gaming experience you can afford. Period.

So why on earth should you disrupt your pixels checking us out?

- We don't have it all; but we will try to get it for you.
- We don't stock products that we don't have confidence in.
- We don't make a couple of items dirt cheap - then charge like wounded bulls on the rest.
- We won't lie about stock levels - we'll give you an honest answer

We currently stock the following vendors products:

Intel	Hercules	Lian Li	Logitech
Vantec	Creative	AMD	Western digital
ASUS	Fujitsu	EPOX	Adaptec
MSI	Mitsubishi	ZALMAN	Canon
GlobalWin	Hewlett Packard	Macase	Hynix
LeadTek	Kingston	Kingmax	

And a little group I like to call "Non Specific Up There" They make all the case mod stuff: neon's, windows, cables, thermal compound, epoxy conductive paste et al
All Ailean Systems are built with Arctic Silver3, burnt-in for 24hrs and warranted for 3 years

Note the lack of prices: That is because these ads are submitted over a month prior to publication - and you keep the mag for a month - so check the web site - putting prices in a magazine, is a bit like peeing yourself in a dark suit; It makes you feel all warm, but no one takes any notice.

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THE IT DIRECTORY

www.atomicmpc.com.au/dealers.asp?mode=1

Trying to find a product or service? Go to www.atomicmpc.com.au/dealers.asp?mode=1 to find the details of the following resellers, manufacturers and distributors, plus many more. The site lists the Web address, company address, phone, email and fax.
Our Web site will help you to find that elusive product, the ideal reseller, manufacturer or distributor of a particular brand; or simply a product type. If you know what you are looking for, you can search for the most convenient place to buy it or simply research the options available to you. It's up to you how tight you set the criteria: you can do an advanced search and cross-reference by product, postcode, brand and so on. So quick and simple you'll wonder how you ever did without it!

- 3CO
- AA Brothers
- Abet Computers
- Access 1
- ACCO Australia
- Accord Technologies
- Acer
- Activision
- A Drive Computers
- Allteq Pty Limited
- Amexcom
- Another World Computer Centre
- Ailean Technologies
- Alphazone Computers
- ARC Computers
- Aspen Tech
- ATF Computers
- AusPC Market
- Austin Computers
- Australia Computers Online
- Australia IT
- Australian Computer Recyclers
- Australian Network Solutions
- Autodesk
- AV Computers
- Below Zero
- Best Byte
- Bevdan Business Services
- Bitronics Computers
- Bits & Bytes
- BITS Computer Graphics
- Bitstorm
- Brimar Electronics
- Briter Comuters
- Brother International
- Cam1 Computer Wholesale
- Centercom Computers
- CIP Computer Solutions
- Compaq Computer Australia
- Complete Peripheral Services
- CompuEdge Pty Limited
- Computer Cyber Shop
- Computer store @ Newport
- Computer Troubleshooters
- Computer Warehouse
- Computers 4 Less
- Connect U Up Computing
- Connexus Internet
- Cool PC
- Cougar Computers Canberra
- CR Computers
- Creative
- Creative Zone
- Crossys Computers & Electronics
- CW Supplies
- Cyberdec Australia
- Cybertech Consulting
- Cybus Computers
- Cydex Computers
- D Link Australia
- Dell
- Dlife
- DNAML
- Dot Systems
- Duncan Computer Services
- DX Computers
- EBM Computers
- Electronic Product Warehouse
- Emagen
- Eurocom Computers
- EPSON
- EYO Technologies
- Flexinet
- FNQ Computers
- Focal Point Computing
- Forte Computers Publishers (Aust.) P/L
- Fuji / Hanimex
- Games Warehouse
- GCC Technology
- Gigaworld Computer Systems
- Go-Xtreme Tek
- Griffler Enterprises
- Guillemot
- Hallmark Computer International
- Hewlett-Packard
- Hitachi Australia
- Hollywood 7 Computers
- HP Paradise
- Impact Systems Technology
- IMSI (Australia)
- In Learning
- Ingram Micro
- INKme
- Inktec Australia
- Innovision Technology Australia
- Integrity Data Systems
- Iomega
- I.T2 The Max
- IT National
- Jack Of All Games
- Jim's PC
- Karana Computer Systems
- Kingston Technology
- KM Computer Systems
- Kodak Digital & Applied Imaging
- LaCie Australia
- Landmark Computers
- Landmark IT Resources
- Lanyon Computers
- Laptop Land
- Leader Computer Systems
- Leading Pacific Australia
- Lemurian Technologies
- Lexmark
- Lidcam Technology
- Loucra Computers
- Mac Troubleshooter
- MacroMax Computers
- MacSense Australia
- Mates Rates Computers Services
- MAUS
- Maxtek International
- Maxwell Optical Industries
- MegaPC
- Microdirect
- Micropaq
- MicroStar International
- Microstructure Computers
- Microtech Corporation
- Mindflux
- Mitsubishi
- Mobile PC Workshop
- Modtech
- Multimedia Technology
- Navada Computer Services
- NETGEAR
- NetPlus Micro Computers
- newcomputers.com.au Box Hill
- newcomputers.com.au Oakleigh
- NG Computing
- NoLimitz Computers
- Nortec Computers
- Notebook Solutions
- OA-Link
- Ocean Office Automation
- OKI
- One Group Computers
- Online Marketing
- Organiser World
- Overclockerz Supplies
- Oztec Computer
- Palmwoods Computers
- Panasonic
- Parramatta Computers
- PAW Products
- PC Case Gear
- PC Case Mods
- PC Cooling Australia
- PC Extreme
- PC Magic
- PC Repair Centre
- pcXtra Computers
- Peakhour
- Performance, Memory & Peripherals
- Perpetua
- Philips
- PICA Software
- Pioneer Computers
- Point Computer Systems
- Proven Technologies
- Pullman Computing
- Punch Technology
- Purpose Built Computers
- QD Innovative Computer
- Questek Components
- Rectron Electronics
- Ricoh Australia
- RTV Computer
- Sage Distribution
- Samsung
- Santacom Computers
- Sanyo
- Sasquatch Solutions
- Sato Enterprises
- Scorpion Technology
- Shane's Micros
- Sharp
- Short and Tall Computing Services
- Silicon Memory Technologies
- Sony
- Speedcom
- Surplus Computer Products
- TEAC
- TeamLink Australia
- Technology shop
- Techno Magic
- Tech Pacific
- The Cartridge Man
- THX – The SONY I.T Store (Parramatta)
- Toowoomba Computerland
- Toshiba
- Trinix Computers
- Tweak Town Shop
- Viewsonic Australia
- Warren Computers
- WB Gamezone
- Western Computer Networks
- XClusive Software
- Xenon Systems
- Yamaha Music

Fields of joy

Here at Atomic we love technology. And there's nothing that pushes our buttons more than technology that makes our games more realistic. Mention a rumblepak and we smile sweetly. Start talking force feedback and we'll flick the ends of our hair and blush. Sit us in one of those motorised F1 frames and we'll ask you where, when and how many degrees of freedom.

But now there's something that's made us sit up straight in our transducer chairs. It seems some crazy boffin type in the US has designed an entire body suit that responds to electronic stimulus. Yes, that's right – a virtual reality suit that for once actually works.

That guy is Daniel Repperger, a virtual reality systems engineer at the Wright-Patterson Air Force Base in Dayton, Ohio. Repperger (a confirmed gaming nut and our next pin-up boy) reportedly decided he wanted more than just a little buzz when he hit the gutter in Project Gotham. Using the massive funding of the US Airforce, he designed a suit studded with electromagnets that responds to a magnetic field. Not only can you wear it for kicks in the Mardi Gras, but if you sit in a field strong enough, the suits bucks just like a bubblejet on ball bearings.

Sounds great, yeah? Well, we thought long and hard about this (trust us – long and hard) and came to the conclusion it could create more problems than it was worth. Strap on your suit and fire up Dead or Alive – soon you've got bruises on bruises, and that cute little blonde's thighs just aren't looking so cute any more.

Racing and flying games would push and pull your body to new extremes, and you'd get a mandatory bucket with every purchase. Playing Oddworld would force things out of you that you didn't know you had in you.

Then again, there's one industry that's going to love this suit. The textiles industry, right? Well, actually, no – the sex industry. Finally, there's a device that can simulate the lightest stroke of a feather, to the beefiest smack of a Germanic madam (each to their own).

Combine that with LCD stereoscopic goggles and you've got your very own Roman orgy. T-minus five years and counting – ten if the US Air Force works out where all its research money is disappearing to.

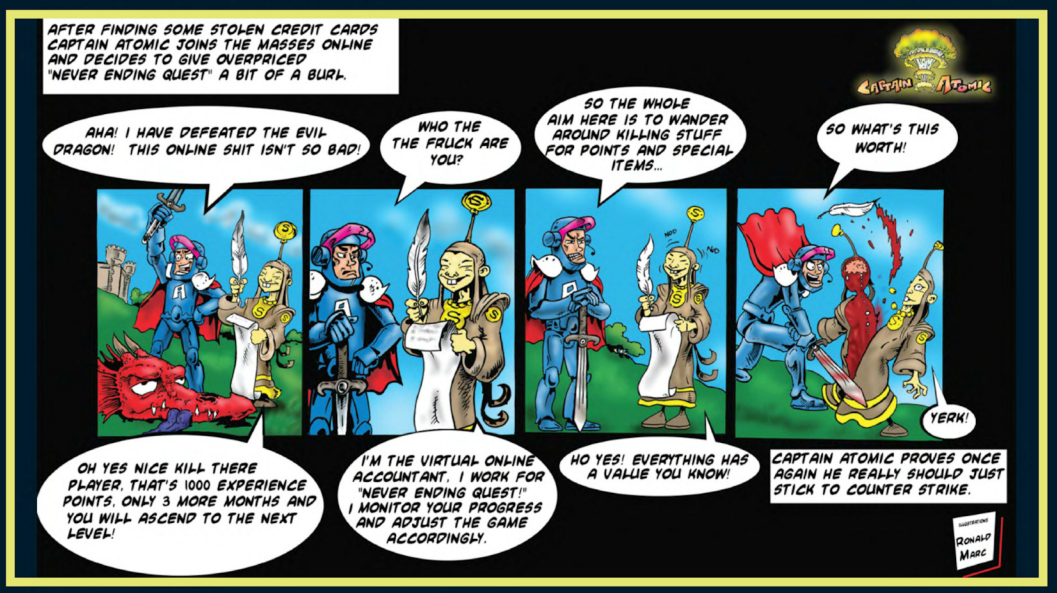
Imagine what this is going to do to the world as we know it. Bachelors will no longer be employable: they'll just sit at home all day, plugged into their Virtual Vixens. Married men will sneak out on weekends to use their mates' suits, then end up divorced due to 'irreconcilable differences'. Eventually, all men will become bachelors, and the world's workforce will be entirely comprised of angry women.

Well, maybe we're over exaggerating. But it could happen. Really. The consequences of this technology are not to be under estimated. We'll be able to see, hear and feel things that we could never have done before. We could walk on Mars; navigate the Mariana Trench; even eat spaghetti in white pants. It's almost unlimited. Almost.

The biggest hurdle is going to be cost. We worked out that you'd have to sell enough issues of Atomic to circle the globe three times to buy one of these suits.That's an awful lot of subscribers for just one lousy suit. Then you'd need a controlled magnetic field to make the suit actually work – preferably one that doesn't toast you from the inside out.

And finally, you'd need a very good lawyer for when your mobile phone rings and the suit goes berserk, breaking all your limbs. Mark our words: the time will come when you'll be slipping into your latest console and wandering the rings of Saturn. For now, we're satisfied with our bumpy steering wheels and buzzy control pads. Mmmm. . . buzzy. . .

John Simpson



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Maxtor's product family meets the needs of all users, in terms of connectivity, capacity, speed, transfer rate and price.

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For users who need maximum storage capacity and push their computers to the limit (large Internet downloads, digital video editing, games, etc.), 1394 hard drives are the ideal solution (with capacity of up to 160 GB and high transfer rates) as they hold more than 12 hours of uncompressed digital video.
Mac and PC compatible.

Maxtor Personal Storage 3000DV FireWire
With its 7200 rpm hard drive and innovative electronics, this new model - which is a complement to the external storage range - is proving to be up to 56% faster than its 40 and 80 GB predecessors. Video game users can store up to 75 CD-ROM and get the performance they need for real-time response.
Mac and PC compatible.

Maxtor Personal Storage 3000LE USB 2.0
Maxtor's latest external hard drive is a genuine technological innovation. With new USB 2.0 connectivity, it offers users a transfer rate of up to 480 Mbps and up to 120 GB of storage that is easy to install and compatible with any USB-enabled computer.
Mac and PC compatible.

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